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1. Student description

Student OB is a 12-year-old girl at Edison Middle School. OB is categorized under the Autism Spectrum for her disability. The student is in a general education classroom setting with accommodations and some co-taught classes, except she is pulled out for her math class. OB is very compliant and friendly throughout the school day. OB is socially receptive and expressive with her verbal language. OB works very well with written directions and frequent prompts throughout her day. OB has some difficulties with reading and listening comprehension. OB is verbal and has the ability to write. OB can benefit from being with peers and practice her conversational skills. Student tends to benefit from frequent adult interaction to prompt or redirect the student throughout the day. OB has difficulties with social communication.

Skill Sequence:

IEP Objective (12 month time span to meet)
During any class or a social gathering at school, O will stay on topic and take turns throughout a conversation for 15 minutes.
9-Month Objective
While talking to a peer or adult during the school day, O will take 15 turns throughout 5 conversations and stay on topic with 100% accuracy for 6 weekly probe trials.
6-month objective
While talking to a peer or adult during the school day, O will take 10 turns throughout 3 conversations and stay on topic with 100% accuracy for 6 weekly probe trials.
3-month objective
After reading a social story during any part of the school day, O will take 10 turns throughout a conversation and stay on topic with a peer with 100% accuracy for 5 weekly probe trials.

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After reading a social story during flex/homeroom, O will take 7 turns throughout a conversation and stay on topic with a peer with 100% accuracy for 5 weekly probe trials.
After reading a social story during flex/homeroom, O will take 7 turns throughout a conversation and stay on topic with an instructor 100% accuracy for 5 weekly probe trials.
Beginning Skill Objective After reading a social story during flex/homeroom, O will take 5 turns and stay on topic through a conversation with an instructor with 100% accuracy for 5 weekly probe trials.

Description and photo of AAC system/materials and explanation for why these materials are appropriate for your focus student:

Reference for Social Stories:

Do2Learn, (1999). *Participating in reciprocal conversation.* Retrieved from http://www.do2learn.com/

Do2Learn, (1999). *Staying on topic.* Retrieved from http://www.do2learn.com/

The AAC system I will be using for this program are 2 social stories. A social story is used to help students learn appropriate behavior and skills. The specific parts of a social story are directive, descriptive, perspective, affirmative, and cooperative. These components make up a social story to assist students with social needs.

 I found both social stories on an educational website www.do2learn.com/
The first social story is about Reciprocal Conversations. The second social story is about staying on topic throughout a conversation. The other materials needed are comprehension questions about the social stories. The comprehension questions were also found on the website. In the beginning of instruction, the instructor will take out the two social stories. The social story has words with pictures on it. The reciprocal conversation social story has short answer comprehension questions and the staying on topic social story has fill in the blank comprehension questions.

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These materials are appropriate for my student because she has a lack of social skills during the school day. O has difficulties with turn taking and staying on topic throughout conversations during the day. Social stories are appropriate for my student because they can understand the social cues from reading the social story and generalize

Conversation Turn	Response	Turn taking
1	YES	NO
2	YES	NO
3	YES	NO
4	YES	NO
5	YES	NO

them into their own conversation skills. These social stories will assist O in being able to some day have independent conversations and know when to change topics and when to respond during a conversation.

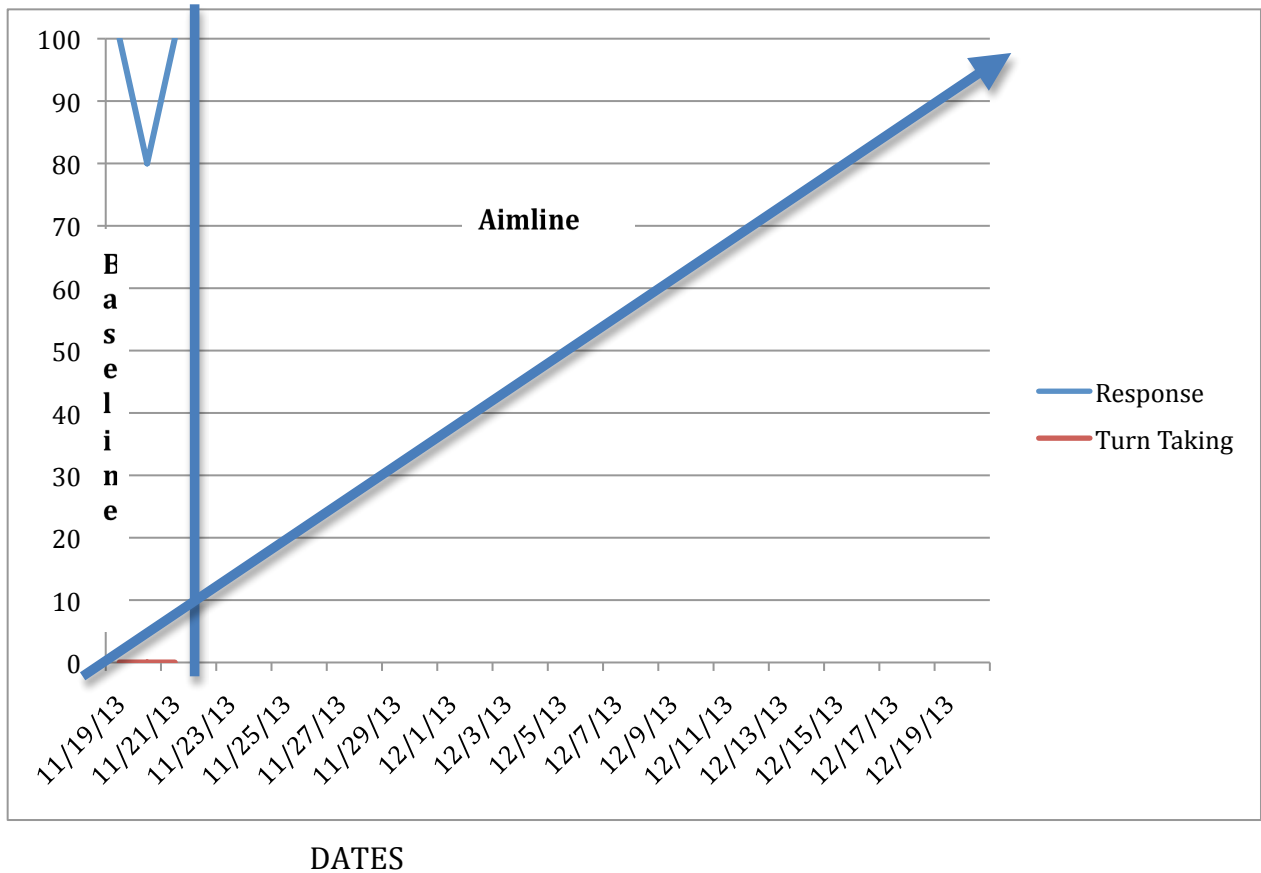**BASELINE DATA, GRAPHS, AND BLANK DATA SHEETS**

Baseline: 11/19/13

11/20/13

Conversation Turn	Response	Turn Taking
1	YES	NO
2	YES	NO
3	YES	NO
4	NO	NO
5	YES	NO

11/21/13

Conversation Turn	Response	Turn Taking
1	YES	NO
2	YES	NO
3	YES	NO
4	YES	NO
5	YES	NO

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GRAPH:

During Baseline, O would respond during a conversation with 100%, 80%, and 100% accuracy, and for taking turns, O had 0%.

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BLANK DATA SHEETS

DATE: _____

Conversation Turn	Response	Turn Taking
1		
2		
3		
4		
5		

DATE: _____

Conversation Turn	Response	Turn Taking
1		
2		
3		
4		
5		

DATE: _____

Conversation Turn	Response	Turn Taking
1		
2		
3		
4		
5		

DATE: _____

Conversation Turn	Response	Turn Taking
1		
2		
3		
4		
5		

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Instructional Program

Name of student: O.B. **Initiator(s):** IEP Team **Who will manage program?** M. Collins

Context for instruction:

During this intervention, the instruction and assessment will occur during "flex", or the student's homeroom. The instruction will be from 9:30-9:45 on Mondays through Thursdays, and the assessment will occur on Fridays from 9:30-9:45. Homeroom is a class for students to converse with each other and to play games or activities. This will give Student O a chance to practice conversational skills during this natural situation. Some material that will be needed for this program will be a conversational script. The environment of instruction consists of 4 students, and they all fall under the Autism Spectrum. The activities going on in the classroom are social activities such as board games, discussions about classes/ concerns about classes, using zones of regulations to talk about people's emotions and using social thinking. The adults present in the room are a special education teacher, a practicum student, and the social worker once a week. Instructors participate in all activities with the students throughout the class period.

Research Rationale:

Delano, M., & Snell, M. E. (2006). The effects of social stories on the social engagement of children with autism. *Journal Of Positive Behavior Interventions*, *8*(1), 29-42.

This article talks about using social stories to increase appropriate social engagement with peers, decrease inappropriate social engagement with peers, and decrease the absence of social engagement with peers. The social story used in this experiment helps instruct four different skills: "securing attention, initiating a comment, initiating a request, and making a contingent response" (Delano, M., & Snell, M. E., 2006, p. 33). After 15 intervention trials of reading the social story, answering comprehension questions, and then having a 10 minute play session with peers, all students increased in appropriate social engagement, decreased inappropriate social engagement, and decreased the absence of social engagement with peers.

Scattone, D., Tingstrom, D., & Wilczynski, S. (2006). Increasing appropriate social interactions of children with autism spectrum disorders using social stories. *Focus On Autism and Other Developmental Disabilities, 21*(4), 211-222.

This article talks about using social stories with 3 boys diagnosed with ASD who have a lack of social skills with peers at school. Students would read a social story during a free time activity and then answer comprehension questions. The social story contained information on how the students were expected to act and have appropriate social interactions during their free time. The teacher would reread the social story until the

students received 100% on their comprehension questions. The student would either read the social story to the teacher or if they are not able to read, the teacher would read it to the student. The students would read their social story right before they would go and interact with peers. The results showed that 2 out of the 3 students increased in appropriate social interactions with peers.

Program Objective:

After reading a social story during flex/homeroom, O will take 5 turns and stay on topic through a conversation with an instructor with 100% accuracy for 5 weekly probe trials.

Generalization:

In order to facilitate generalization, the student will work on conversational skills with her social story with students in the classroom. Once the student has mastered the skill in the classroom with peers and instructors, the student will then read the social story, then go throughout different settings in the school building to have conversations with other people. The student will be able to have conversations with many different people and about different topics. The student will also be taught in a natural setting so that the student will be able to generalize after instruction.

Rationale:

This particular skill is being taught so the learner can be a part of conversational activities with her peers. This skill will help the student adapt in a general education classroom and be able to meet and talk to other peers. Having conversational skills are also important because it can help O later on in life with talking to people in the real-world. This skill is such a natural instruction because conversations happen with people throughout an entire day and there are many times the student will be able to generalize this skill throughout her day.

Assessment Procedures:

Baseline:
1. Sit next to Student O in flex/homeroom from 9:30-9:45.
2. say "Hello." to Student O.
3. Give Student O 10 seconds to respond.
4. If student responds, write YES on the data sheet under "RESPONSE".
5. If O does not respond/responds incorrectly, write NO on the data sheet under "RESPONSE".
6. If O does not take a turn and ask the instructor a question, write NO under "TURN TAKING".
7. If O does take a turn and ask the instructor a question, write YES under "TURN TAKING".
8. Repeat steps 3-7 five times with the following questions: "How are you?", "What did you do in math class? What did you do in science class? What is your favorite game to play in flex class?

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Probe:

1. Sit next to Student O in flex/homeroom from 9:30-9:45.
2. Read social story with Student O.
3. Read comprehension questions to O.
4. Allow O 5 minutes to answer all 5 comprehension questions independently.
5. Prompt Student O, "Time to talk with _____ (name)".
6. Say, "Hello" to Student O.
7. Allow 10 seconds for O to respond.
8. If student responds correctly without prompt, write YES on the data sheet under "RESPONSE".
9. If O does not respond/ responds incorrectly, write NO on the data sheet under "RESPONSE". Then write what prompt was needed, (DV- direct verbal, IDV- indirect verbal prompt).
10. If O does not take a turn and ask the instructor a question/ asks an incorrect question, write NO on the data sheet under "TURN TAKING" for that specific turn. Then write what prompt was needed, (DV, IDV).
11. If O does take a turn and ask the instructor a question, write YES under "TURN TAKING".
12. Repeat steps 7-11 five times with the following questions: "How are you?", "What did you do in math class? What did you do in science class? What is your favorite game to play in flex class?

Assessment Schedule:

Schedule: Baseline: 3 daily trials
Probe: Student will be assessed every Friday from 9:30-9:45 during flex/homeroom. The instructor will have 5 turns of conversation with the student after reading the social story and completing comprehension questions.

Instructional Procedures:

This instruction will be a most-to-least prompting system. The program will start out with Direct Verbal Prompts: "Ask me how I am". After first two weeks of instruction, fade to an Indirect Verbal Prompt, "What question should you ask me next?" After two weeks of Indirect Verbal Prompts, move to independent conversation skills. If student gives an incorrect answer, move to indirect verbal prompt. If student still gives an incorrect answer, move back to a direct verbal prompt.

Instructional Environment for O: It is important to have O in a rather quiet area during instruction. O can get overwhelmed easily if there is noise and commotion. O may work in flex/homeroom classroom or hallway.

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Materials Needed for Program: The materials needed for this program are the 2 social stories (turn taking and staying on topic), a pencil, and the comprehension questions to the 2 social stories. The Sd in this program is "talk-time with _____ (name)."

INSTRUCTIONAL PROCEDURES
1. Sit next to O at a table in flex/homeroom.
2. Take out social story (Staying on topic and turn taking).
3. Read stories with O during flex/homeroom time. (Have O read the social story).
4. Give student comprehension questions from the social story.
5. Allow student 5 minutes to complete comprehension questions.
6. After comprehension questions are completed, prompt student by saying the following prompt, "Okay, now it is time to talk with _____ (your name).
7. Instructor begins by saying "hello" to student.
8. Allow student 10 seconds for student to respond to "hello".
9. If student does not respond/responds incorrectly, use a direct verbal prompt and say, "When I say hello, you say hello too".
10. Repeat steps 7-8 until student says "hello".
11. Ask student the question, "How are you?"
12. Allow student 10 seconds to respond with (good, bad, okay, proud, happy, sad, or any emotion).
13. After student responds, give student 5 seconds to ask "how are you?" in return.
14. If student does not ask the question/ asks incorrect question, use a direct verbal prompt and say, "After you say how you're feeling, ask me how I am".
15. Repeat steps 11-14 until student asks "how are you?" in return.
16. Answer student's question with appropriate response.
17. Ask the student the question, "What did you do in math today?"
18. Allow student 10 seconds to begin response on what she did in math class.
19. If student does not respond/responds incorrectly, use a direct verbal prompt and say, "When I ask you what you did in math today, tell me the kind of activities or work you did in math class this morning."
20. Repeat steps 16-18 until student responds with what she did in math class that morning.
21. After student responds, give student a brief response, "Oh, nice! How exciting!"
22. Then give student 5 seconds to ask "What did you do while I was in math class?"
23. If student does not respond/responds incorrectly, use a direct verbal prompt and say, "After you say what you did in math class this morning, ask me what I did while you were in math class."
24. Repeat steps 21-22 until student asks "What did you do while I was in math class?"
25. Answer the student with appropriate response.
26. Ask student the question, "What did you do in science today?"
27. Allow 10 seconds to respond.
28. If student does not respond/responds incorrectly, use a direct verbal prompt and say, "O, when I ask what you did in science. Tell me the kind of activities or work you did in science this morning."
29. After student responds, give student brief response, "Very cool. That sounds interesting."

30. Then, give student 5 seconds to ask the question, "What did you do while I was in science class?".
31. If student does not ask the question/asks incorrect question, use a direct verbal prompt and say, "Now ask me what I did while you were in science class."
32. Repeat steps 20-24 until student asks, "What did you do while I was in science class?"
33. Answer student's question with appropriate response.
34. Ask student the question, "What is your favorite game to play for flex class?"
35. Allow student 10 seconds to respond.
36. If student does not respond/responds incorrectly, use a direct verbal prompt and say, "O, when I ask you what your favorite game to play is, tell me which board game you would like to play."
37. After student responds, give brief response, "Oh nice. I like that game!
38. Then, give student 5 seconds to ask the question in return "What is your favorite game to play during flex?"
39. If student does not ask question/asks incorrect question, use a direct verbal prompt and say, "Ask me what my favorite game to play during flex is".
40. Repeat steps 32-36 until student asks, "What is your favorite game to play in flex?" in return.
41. Answer student's question with appropriate response.
42. Give O verbal praise at end of instruction, "Great job!" "Thanks for working hard".
43. End of instruction.

Reinforcement (type and schedule):

Reinforcement: O will be given reinforcement throughout instruction with verbal praise after correct answers throughout conversation. The student will also be reinforced by the fact that her peers and instructors will continue to have conversations with her.

-O will receive reinforcement after every correct response in the first two weeks of instruction. After O has begun to increase her skills with the social story, reinforcement will decrease to an intermittent schedule and will be reinforced after some responses.

Maintenance:

In order for student to maintain the skill, it is important that the student receives the same instruction every day. If student meets criteria, instruction will begin to be used without the social story. Student will become more independent on initiating, turn taking, and staying on topic throughout a conversation. O will be faded off of the social story once she has shown mastery of conversational skills while using the social story. After using the social story has been mastered, instruction will decrease from 4 times a week to 2 times a week. Student will still be assessed every Friday. Reinforcement will be given from a most to least prompt. Reinforcement will still be given, but will be faded once student has mastered instruction.

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      In order to monitor effectiveness, assessor should be using measurable, observable conditions. If the student meets the program objective, increase the level of turns from 5 to 7, then 7 to 10 turns, until student can have full-length conversations without any supports or assistance.

References

Do2Learn, (1999). *Participating in reciprocal conversation*. Retrieved from http://www.do2learn.com/

Do2Learn, (1999). *Staying on topic*. Retrieved from http://www.do2learn.com/

Delano, M., & Snell, M. E. (2006). The effects of social stories on the social engagement of children with autism. *Journal Of Positive Behavior Interventions*, *8*(1), 29-42.

Scattone, D., Tingstrom, D., & Wilczynski, S. (2006). Increasing appropriate social interactions of children with autism spectrum disorders using social stories. *Focus On Autism and Other Developmental Disabilities, 21*(4), 211-222.

The Effects of Social Stories on the Social Engagement of Children with Autism

Monica Delano

Florida State University

Martha E. Snell

University of Virginia

Abstract: A multiple-probe design across participants was used to evaluate the effects of social stories on the duration of appropriate social engagement and the frequency of 4 social skills in 3 elementary-age students with autism. The social skills were seeking attention, initiating comments, initiating requests, and making contingent responses. Following the intervention, which consisted of reading individualized social stories, answering comprehension questions, and participating in a 10-min play session, the duration of social engagement increased for all 3 students with both a training peer and a novel peer. The number of target social skills displayed during the 10-min play sessions increased after the intervention was introduced. Two students demonstrated generalization to a classroom setting. These findings suggest that the use of social stories without additional social skill interventions may be effective in increasing the duration of social engagement and the frequency of specific social skills.

Deficits in functional language and social interaction are a defining characteristic of children with autism (Kanner, 1943). Unfortunately, these deficits not only impede the child's development but also may lead to social withdrawal and isolation. Children who are socially withdrawn, in turn, may be rejected by peers (Rubin & Clark, 1983) and consequently may be more likely to develop behavioral problems than their peers (Ollendick, Weist, Borden, & Greene, 1992). In addition, challenging behavior may serve as a form of communication when language and social development are delayed. Therefore, improving social functioning is one of the most important intervention outcomes for children with autism.

Gray and Garand (1993) introduced the social story intervention as a method of teaching children with autism how to "read" social situations. A social story is a short story that describes the salient aspects of a specific social situation that a child may find challenging. Social stories also explain the likely reactions of others in a situation and provide information about appropriate social responses. Gray (1995) and others (e.g., Attwood, 1998) have proposed that this intervention is consistent with "theory of mind" (Baron-Cohen, 1995) accounts of autism, which suggest that individuals with autism have difficulty understanding that others have perspectives different from their own (Leslie, 1987). This difficulty in attributing thoughts to others may make interpreting social information problematic for individuals with autism. Social stories aim to teach social-perspective-taking by helping children interpret social cues and identify appropriate responses.

According to Gray (2000), a story should be individualized and consist of four basic types of sentences: (a) descriptive, (b) directive, (c) perspective, and (d) affirmative. Gray also defined the relationship between different types of sentences in the *Basic Social Story Ratio*, suggesting that a social story should have a ratio of 2 to 5 descriptive, perspective, and/or affirmative sentences for every 0 to 1 directive sentence. This means that for every directive sentence in the story there will be two to five other sentences in the story. Though this method is not based on empirical research, Gray suggested adhering to these guidelines to ensure that the story describes a situation and does not merely direct the child's behavior.

Gray and Garand (1993) stated that "excellent results have been obtained through the use of social stories," and since their introduction, social stories have been adopted by many practitioners and are described in several recent methods texts (e.g., Quill, 2000; Simpson & Smith Myles,

1998). However, there are only 12 published empirical studies in which researchers evaluate the effects of the social story intervention. In 6 of the 12 studies (Adams, Gouvousis, VanLue, & Waldron, 2004; Brownell, 2002; Kuoch & Mirenda, 2003; Kuttler, Myles, & Carlson, 1998; Lorimer, Simpson, Myles, & Ganz, 2002; Scattone, Wilczynski, Edwards, & Rabian, 2002), challenging behaviors were the primary dependent measures. Hagiwara and Myles (1999) examined the effects of multimedia social stories on ontask behavior and hand washing, and Bledsoe, Myles, and Simpson (2003) used social stories to improve mealtime skills. Researchers collected data on specific social skills in only 4 of the 12 studies.

Swaggart et al. (1995) used a single-subject, AB design to evaluate the use of a social story intervention combined with social skill training and a response-cost program to teach appropriate social behavior to three elementary-school children. The study took place in a self-contained laboratory classroom for students with autism. Greeting behavior, sharing, and hitting were targeted behaviors. Although the researchers did not use an experimental design, all three participants demonstrated an increase in positive target behaviors and a decrease in negative target behaviors following intervention.

Barry and Burlew (2004) also evaluated social stories in a self-contained classroom. An ABCD multiple-baseline design across two participants was implemented to examine the effects of the social story intervention on choice making and appropriate play. Both students demonstrated an increase in appropriate play behavior, and both also showed improvement in making independent choices.

Norris and Dattilo (1999) used a single-subject AB design and were the first to examine the relationship between a social story intervention and the social interactions of a student with autism in an inclusive setting. The 8-year-old participant had average cognitive skills and demonstrated a low rate of peer interaction during baseline and a high rate of inappropriate interactions (e.g., echolalia). The intervention consisted of having the student read the story aloud just before lunch, with a teacher available to answer questions and check for comprehension. In addition, a brainstorming procedure was implemented to identify examples of appropriate behavior, and the story was accessible to the participant at other times during the day. Results indicated that the rate of inappropriate interaction decreased but the level of appropriate peer interactions did not significantly change after the intervention was introduced.

One of the most rigorous examinations of social stories to date was conducted by Thiemann and Goldstein (2001). Their study evaluated how combining different visual cues (e.g., social stories, picture cue cards) with video feedback affected specific social skills of five children with autism. Two typical peers were grouped with each student with autism, and a multiple-baseline design across two or three skills was replicated across five triads. Targeted skills consisted of (a) securing attention, (b) initiating comments, (c) initiating requests, and (d) making contingent responses. Following initiation of the intervention, the focus children showed improved rates of social behaviors compared to baseline. Two students showed some generalized treatment effects, and one of the focus students showed generalization of the skills to his general education classroom. Overall, this research suggests some possible benefits of using a combination of visual supports to improve social communicative skills in children with autism, but the specific effect of implementing the social story alone is unclear.

The purpose of the present study was to evaluate the effects of social stories on the duration of appropriate social engagement in three children with autism. This study adds to the literature by evaluating the use of social stories to improve the same social skills identified by Thiemann and Goldstein (2001) but without the addition of simultaneous experimental interventions and with repeated assessment of generalization across people and settings.

Method

PARTICIPANTS

Three children with autism and six nondisabled peers participated in the study. Each target student with autism was paired with a same-age peer for the intervention sessions. Target students were paired with a second peer for generalization probes. Each target student was receiving special education under the category of autism (Individuals with Disabilities Education Act Amendments of 1997). Each student also had the following characteristics: (a) used functional verbal communication, (b) had at least prereading or beginning reading skills, (c) showed the ability to follow directions, and (d) was given daily opportunities for interaction with same-age peers in general education. In addition, students demonstrated impairment in social functioning, including infrequent verbal initiations toward peers, lack of social involvement with peers, and difficulty responding to initiations from peers.

Derrell was an African American boy, 6 years of age, who was receiving special education services under the category of autism. He participated in a kindergarten classroom for the majority of the school day. He also received speech–language services weekly and individual discrete trial training for 90 min per day. During discrete trial drills, Derrell accurately identified letter names and sounds and recognized approximately 2 dozen sight words. However, he performed below grade level in the general education classroom environment. Derrell communicated with single words and short phrases. However, teachers reported that he often reverted to jargon when interacting

with peers, especially if the interaction exceeded one or two turns.

Sean was a Caucasian boy, 6 years of age, who was receiving special education services as a student with autism. During the course of the study he was fully included in a kindergarten class and received speech–language services. His academic performance was below grade-level expectations. Sean spoke fluently and with long phrases. Teachers reported that he frequently initiated interaction with adults but often played by himself instead of seeking peer attention.

Thomas was a Caucasian boy, 9 years of age, who was receiving special education services as a student with autism. He participated in a second-grade class for the majority of the school day. He received individual discrete trial training for 2 hours per day and speech–language services for an hour per week. Thomas spoke fluently, using long phrases. According to school records, he was reading on a first-grade level and could write a three- to five-sentence paragraph using a prompting format of first, next, and last.

The six typical peers, three boys and three girls, were nominated by their teachers. Three of the typical peers were randomly assigned to serve as training peers and were play partners during intervention sessions. The other three peers were assigned to serve as novel peers and were play partners during play sessions that assessed generalization across people.

SETTING

Study participants attended the same elementary school located in a rural area with a population of 14,000 and in a school district that served 2,000 students. Intervention sessions for the kindergarten students occurred in the play area of a resource classroom. Setting generalization probes for these students were taken during center time in their respective kindergarten classroom. During center time students had an opportunity to play in small groups and with a variety of materials (e.g., art, building, pretend play). Intervention sessions for the second-grade student occurred at a table in an open area between classrooms. Setting generalization probes were taken during an afternoon break time in the second-grade classroom.

DEPENDENT MEASURES

As shown in Table 1, a coding scheme was developed for this investigation based on the work of Thiemann and Goldstein (2001), Kamps et al. (1992), Niemeyer and McEvoy (1989), and others using similar codes for social skills research (e.g., Dugan et al., 1995). Duration data were collected for the following dependent measures: (a) appropriate social engagement with peer, (b) inappropriate social engagement, and (c) the absence of engagement with peer.

Data were also collected on the frequency of four target social skills: seeking attention, initiating comments, initiating requests, and making contingent responses. These were the same skills identified by Thiemann and Goldstein (2001), with modified definitions.

Observation sessions were videotaped with a digital camcorder. These tapes were then downloaded to a laptop computer and converted to MPEG movie files such that a 10-min movie file was created for each experimental session. Movie files were coded using a computerized data collection system, *PROCODER DV* (Tapp, 2003). As the observer watched the movie, data were collected on both duration measures and frequency measures.

After each movie was coded, the corresponding data file was exported to the *Multi-Option Observation System for Experimental Studies* (*MOOSES*; Tapp & Wehby, 1992), a computerized data-collection and data-analysis system. This program was used to analyze the data from *PROCODER DV* files so that the total duration or total frequency could be determined for each dependent measure.

Periodically throughout the study, students were audiotaped as they waited for the experimenter to start an intervention session. During these covert probes, data were collected on the four target social skills.

EXPERIMENTAL DESIGN

A multiple-probe-across-participants design (Horner & Baer, 1978) was used to evaluate the effects of social stories on the social engagement of three students with autism. This design was selected so that baseline data would not need to be collected frequently over an extended period of time.

PROCEDURE

Prebaseline Assessment of Target Students

Prior to the first experimental session, the experimenter conducted three informal assessments of the target students to determine their preferred play activities and to assess their social and comprehension skills. First, the students were observed during play and interviewed with their training peers to identify play activities for the study. Second, the experimenter observed the students during several classroom activities and interviewed teachers to determine whether the intervention goal of increasing specific social communication skills matched the students' instructional needs. Finally, to identify the appropriate method for presenting social stories, each student participated in a brief comprehension assessment, whereby the experimenter read students generic stories using one or more of the four story formats available for this study and had the students answer comprehension questions about each story. On the basis of the results of these assessments, Derrell and Thomas were assigned the *picture symbol* story

Table 1. **Definition of Dependent Measures**

Dependent measure	Description
The duration of the following behaviors was coded[a]:	
1. Appropriate social engagement with peer	Saying one or more understandable words while positioned within a meter of a peer and with body oriented toward the peer **and/or** Directing a gesture/movement toward a peer (e.g., waving, handing object to peer, tapping peer on the shoulder, sharing materials) or making a cooperative response (e.g., playing a cooperative game, adding a block to a structure the children are building together) within 5 seconds of prior social behavior **or** Responding with verbal, gestural, or movement response within 5 seconds of peer's initiation toward the target child.
2. Inappropriate social engagement with peer	Hitting, cursing, destroying materials, inappropriately throwing materials.
3. Absence of social engagement with peer	The child is not engaged in social interaction of any kind with a peer for more than 5 seconds (e.g., more than 5 seconds elapse without a child's directing a gesture, saying one or more words while positioned within a meter of peer, or taking a turn in a cooperative activity). **or** One of the children leaves the activity area (more than 3 feet outside of specified area)
The frequency of the following behaviors was coded[b]:	
1. Seeking attention	Coded if the target child (a) requests attention from peer, (b) calls the peer's name to get attention, or (c) uses gestures to get attention (e.g., taps peer on shoulder)
2. Initiating comments	Coded if after a 3-second interval the target child makes a comment about an ongoing topic or activity. The comment is not contingent on peer's utterance and not used to request information. The comment may describe the activity, compliment peer, reinforce peer, or express enjoyment about the activity or interaction.
3. Initiating requests	Coded if after a 3-second interval the target child requests information, objects, or actions. This does not include requesting clarification of a peer's prior utterance and is not contingent on peer's utterance.
4. Contingent responses	Coded when target child appropriately responds (verbally or nonverbally) to a peer's utterance within a 3-second interval. This response could involve acknowledging the peer (e.g., "Huh"), agreeing, answering a question, responding with a related comment, or clarifying the peer's comment or question.

[a]The coding scheme used for this investigation was adapted from the prior work of Thieman and Goldstein (2001), Niemeyer and McEvoy (1989), and others using similar codes for social interaction research (e.g., Dugan et al., 1995; Kamps et al., 1992). [b]Source: Thieman and Goldstein (2001).

format. Stories were typed on 8.5-inch × 11-inch white paper with 20-point Times New Roman print. The software program *Writing with Symbols* (Widgit Software, 2000) was used to embed two to three picture symbols in each sentence of story text. Sean used the *text + read aloud* story format. Sean's stories contained only text. During all experimental sessions the experimenter read the story aloud to the students.

Social Validity and Prebaseline Story Development

Social validation involves assessing the social acceptability of intervention programs (Kazdin, 1977). Wolf (1978) sug-

gested that social validity should be established for goals, procedures, and outcomes. The goal of the social story intervention was to increase the target children's interaction with peers. Teachers reported that the target children spent little time interacting with peers, and these reports were verified by the researchers through classroom observations. The researchers used several procedures to examine the social validity of treatment and of treatment effects. These procedures are described next.

Peer Brainstorming. The experimenter met with the target students and their peers and conducted a 20-min

brainstorming session. Following a procedure similar to Thiemann and Goldstein's (2001) procedure, the experimenter presented a list of target skills and sentences related to "How you can talk to your friend." The target skills included (a) getting a friend's attention, (b) learning how to start talking about what one is doing, (c) asking questions, and (d) solving problems together. Skills were discussed one at a time, and the children were asked to think of phrases to match each target skill. The experimenter wrote all of the suggestions on poster paper during the session, and several of the students' phrases were later incorporated into the social stories.

Social Stories. A set of social stories was written for each target student using the sentence types described by Gray (2000) and adhering to the *Basic Social Story Ratio* of two to five descriptive, perspective, and/or affirmative sentences for every directive sentence (Gray, 2000; see Table 2). The social stories written for this study also contained information specific to the session's play activity and an example of each of the four target social skills: securing attention, (e.g., "Look!"), initiating a comment (e.g., "I like this game"), initiating a request (e.g., "Help me"), and making a contingent response (e.g., saying "Yes" in response to a question).

Teacher Consultants. After the stories were written, one third of the stories for each student was reviewed by a panel of four teachers who checked for adherence to Gray's guidelines and inclusion of the four target social skills in each story. The consultants were two special education teachers and two speech–language therapists who had experience writing and using social stories with children with autism.

SOCIAL COMPARISON ASSESSMENT

The social comparison method is one way to assess the social validity of treatment effects (Kazdin, 1977). Prior to the start of baseline data collection, six typically developing peers were observed. Three kindergarten students were observed in a kindergarten classroom during center time. Three second-grade students were observed during a break

time in their classroom. Each child was observed for four 10-min sessions, and data were collected on the following measures: (a) duration of appropriate social engagement, (b) duration of inappropriate social engagement, and (c) duration of the absence of social engagement. These data were used for comparison purposes during generalization probes with target students.

Baseline

Baseline sessions consisted of three parts: (a) story reading, (b) comprehension check, and (c) play session. The story format identified during the comprehension assessment was used during story reading. The target child and his training peer were brought into the resource area, and the experimenter read a generic story to them. At the conclusion of the story reading, the first author asked the target student four or five questions to assess his comprehension of the story. When the target child could correctly answer at least 75% of the questions, both children were instructed to go play in the play area.

The play session was 10 min in duration. During this time the experimenter did not interact with the students unless they were physically harming themselves or each other or either child was destroying materials or was visibly upset (e.g., reported feeling sick, engaged in a tantrum), in which case the session was ended. If either student sought the experimenter's attention during the play session, the experimenter verbally prompted the child to finish playing and then, with the previously mentioned exceptions, ignored any further attempts to interact. Finally, a probe (described later) was conducted in each generalization situation.

Intervention

Intervention sessions consisted of three parts: (a) social story reading, (b) comprehension check, and (c) play session. During the social story reading, a social story that described the day's activity was read to the target student and his peer. The procedures for the comprehension check and play session were identical to baseline procedures. When Derrell started intervention, no additional baseline data were collected on the other two target students until Derrell's data met the first criterion. The first criterion re-

Table 2. **Sample Social Story Sentences**

Sentence type	Sentence role	Sample sentence
Descriptive	Is a factual statement	Children play many different types of games.
Perspective	Describes a person's thoughts or feelings	The teacher likes it when we put away the toys.
Affirmative	Provides reassurance	It's okay.
Directive	Suggests possible responses to a situation	I will try to use my words.

Note. Adapted from Gray, C. (2000). *The new social story book.* Arlington, TX: Future Horizons.

quired that intervention data for appropriate social engagement show (a) an increase in level, (b) an accelerated slope, (c) an increase in median, and (d) little or no overlap with baseline data. When Derrell's data met these criteria, probes were taken for all participants in the training setting and under generalization conditions. Derrell continued intervention and Sean began intervention. No additional data were collected on Thomas until Sean's data met the first criterion. When Sean's data met the first criterion, probes were taken for all participants in the training setting and under generalization conditions. Then Derrell and Sean continued the intervention and Thomas began the intervention.

Covert Probes

Five-minute covert probes were conducted prior to one out of every five intervention sessions, to collect a sample of data immediately before the intervention session. The target student and his peer came into the intervention setting and were asked to wait in the corner of the room while the experimenter adjusted the camera. A puzzle, colored pencils, and paper were available. The experimenter pretended to be adjusting the camera but actually was audiotaping the children's interaction. The training session immediately followed the covert probe.

Maintenance

A second criterion (Criterion 2) was established to determine when the intervention could be faded. According to this criterion, fading began after at least 15 training sessions and when the duration of appropriate social engagement was at least 40% greater than baseline for four of the last six data points. When a participant met Criterion 2, the social story was then read every other session (Fade A) and all target students participated in generalization probes. Reading the social story every other session continued for six sessions. If the duration of social engagement remained 40% greater than baseline for four of the six sessions, the social story intervention was then presented every third session (Fade B). If the duration of social engagement again remained 40% greater than baseline for four of the six sessions, then the social story reading stopped (No Story). This "no story" condition continued for six sessions. If a participant's performance in any phase of the fading procedure fell below criterion, he was moved back a phase so that the intervention was implemented more frequently.

Generalization

During baseline, as well as each time a participant met the first criterion or the second criterion, generalization probes were conducted for each target student. Target students were observed in a general education classroom situation and with the novel peer in the intervention setting. The children were given no special instructions during these observations, and a social story was not read. A novel peer participated in a 10-min play session with the target child in the intervention setting. Kindergarten students were also observed in their general education classroom during center time, and the second-grade student was observed in his general education classroom during snack time.

INTEROBSERVER AGREEMENT

The first author and a special education teacher who was not affiliated with the host school served as the observers for the study. After scoring 90% or better on a quiz of all dependent measures, both observers trained on the *PROCODER DV* system. Training continued until observers reached a level of 80% agreement for frequency measures and a kappa score of at least .6 for duration measures. Bakeman and Gottman (1986) suggested that kappa coefficients of .6 are considered acceptable indicators of interobserver agreement.

Agreement data were obtained across all experimental settings, conditions, and participants. Each time a participant completed three consecutive sessions, one session was randomly chosen for an agreement check. A second-by-second comparison method (MacLean, Tapp, & Johnson, 1985) was used to assess agreement for duration type codes, and a kappa coefficient was calculated for each agreement check. Kappa coefficients ranged from .59 to .98 for Derrell ($M = .83$), .78 to .99 for Sean ($M = .88$), and .53 to .90 for Thomas ($M = .81$).

Agreement ratios (agreements divided by agreements plus disagreements) were calculated for frequency codes. During agreement checks, two data files were compared using the *MOOSES* program to form a 3-s time window around each event recorded in the primary observer's data file and by searching the secondary observer's data file for matches (MacLean et al., 1985). The agreement ranged from 80% to 90% for attention ($M = 86\%$), 78% to 96% for comments ($M = 87\%$), 74% to 95% for requests ($M = 83\%$), and 80% to 90% for contingent responses ($M = 90\%$).

TREATMENT FIDELITY

To assess the accuracy with which the social story intervention was implemented, we completed a procedural checklist for about a third of all intervention sessions. The checklist described the major steps of implementing the intervention (e.g., the target student, peer, and experimenter read the story together; after reading the story the experimenter asked the target student comprehension questions; after answering the comprehension questions, the children were instructed to play in the play area). Prior to the first observation session, the experimenter defined and explained the procedures to an observer. The observer

completed the checklist while watching a video of an experimental session that included the social story reading, comprehension check, and play session. The mean score across all participants was 93%, with a range of 78% to 100%.

Results

DURATION OF APPROPRIATE SOCIAL ENGAGEMENT WITH PEERS

The primary purpose of the study was to investigate the effectiveness of social stories in increasing the duration of social interaction. Data for the duration of appropriate social engagement with peers are presented in Figure 1.

During baseline sessions, Derrell primarily engaged in parallel play. For example, he and a peer both built with blocks, but they did not work cooperatively and rarely engaged in conversation. Following the introduction of the social story intervention, there was an increase in the level of the data and an accelerating trend was evident. During 15 intervention sessions, Derrell's duration of appropriate social engagement ranged from 137 s to 452 s and there was no overlap between baseline and intervention data. During the initial fading condition (Fade A), Derrell's duration of appropriate social engagement ranged from 262 s
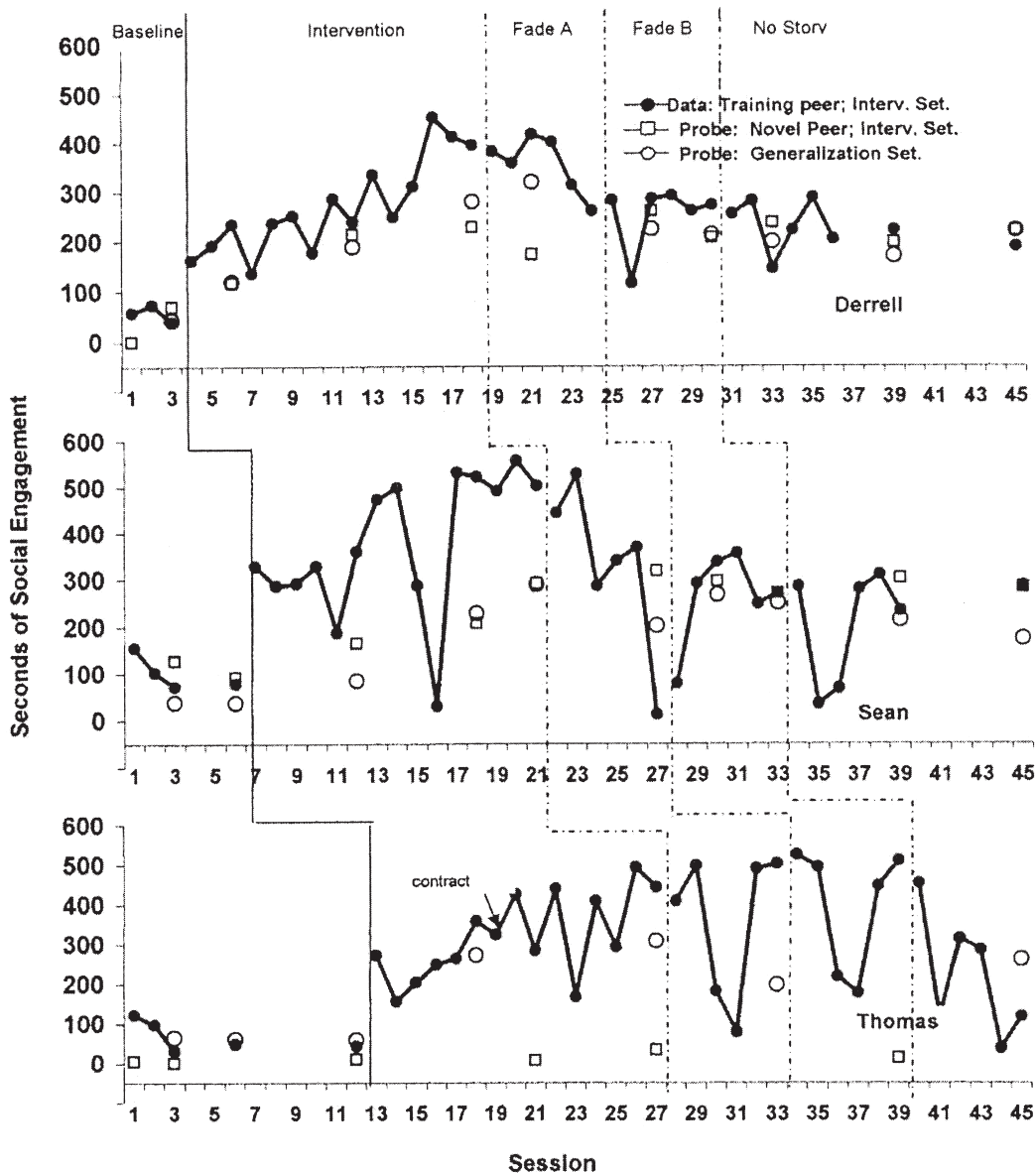

Figure 1. Duration of appropriate social engagement with peers during 1-min sessions.

to 418 s, and the data showed a slight drop in level and a decelerating trend. As the fading process continued (Fade B) and the social story intervention was completely withdrawn (No Story), the level of the data showed slight fluctuations and Derrell continued to exhibit an increase over baseline in his duration of appropriate social engagement. Two follow-up probes were conducted approximately 1 and 2 weeks after the end of the no-story phase; Derrell was socially engaged with a peer for 223 s and 189 s, respectively.

As Figure 1 illustrates, Derrell also participated in 10 play sessions with a novel peer in the intervention setting. During these sessions, his duration of social engagement ranged from 43 s during baseline to 321 s during the fifth probe. Generalization data on setting suggest that Derrell's social engagement increased in the kindergarten class after the introduction of the social story intervention. Derrell spent more time interacting with peers.

During baseline sessions, Sean often tried to engage the experimenter in polite conversation but engaged in low levels of engagement with his peer. Following the introduction of the social story intervention, the level of social engagement increased and showed an accelerating trend. During 15 intervention sessions, the data pattern was variable and Sean's duration of appropriate social engagement ranged from 30 s to 557 s; one intervention data point overlapped with baseline data. The data pattern remained variable during the initial fading condition, and Sean's duration of appropriate social engagement ranged from 12 s to 528 s. As the fading process continued (Fade B) and the social story intervention was completely withdrawn (No Story), the level of the data showed only slight fluctuations. Overall, Sean continued to exhibit an increase over baseline in his duration of appropriate social engagement. Nevertheless, one data point during the Fade B condition and two data points during the no-story condition overlapped with baseline. One probe was conducted about a week after the last session of the no-story condition, and Sean's duration of social engagement was 287 s.

As Figure 1 illustrates, Sean also participated in 10 play sessions with a novel peer in the intervention setting. During these sessions, his duration of social engagement ranged from 37 s during baseline to 289 s during the fifth probe. Sean's duration of social engagement with peers also increased in his kindergarten classroom. During one probe session, Sean's social engagement exceeded the average engagement of his peers.

Intervention sessions for Thomas were conducted in a "pod area" between classrooms. Two teachers had desks in this area and occasionally entered the area during sessions. Thomas directed most of his comments to the experimenter or teachers during baseline sessions and spent a minimal amount of time engaged with his peer. Following the introduction of the social story intervention, the data increased in level and an accelerating trend was evi-

dent. During 15 intervention sessions, Thomas's duration of appropriate social engagement ranged from 155 s to 492 s, and there was no overlap between baseline and intervention data.

Though Thomas showed a gradual increase in duration of social engagement during the first six intervention sessions, after the sixth intervention session his educational team modified an ongoing reinforcement program in an attempt to increase his interaction with peers. Prior to the beginning of this study, Thomas used a behavior contract that reinforced appropriate classroom behaviors (e.g., following directions, sitting at his desk). After the sixth intervention session, this contract was modified so that Thomas could earn reinforcers for talking to peers. Neither the original classroom behavior contract nor the modified contract that reinforced social interaction was part of the social story intervention. After the contract modification, the data pattern became more variable but Thomas continued to exhibit levels of interaction that were greater than at baseline.

During the initial fading condition (Fade A), Thomas's duration of appropriate social engagement ranged from 78 s to 501 s. As the fading process continued (Fade B) and the social story intervention was completely withdrawn (No Story), the data pattern was quite variable, with the no-story condition showing a decelerating trend.

As Figure 1 illustrates, Thomas also participated in seven play sessions with a novel peer in the intervention setting. During these sessions, his duration of social engagement ranged from 61s during baseline to 308 s during intervention. During the course of the study, Thomas showed little improvement over baseline performance in his second-grade classroom.

FREQUENCY OF TARGET SOCIAL SKILLS

A second purpose of the study was to investigate the effects of the social story intervention on the frequency of the four target social skills examined by Thiemann and Goldstein (2001): seeking attention, initiating comments, initiating requests, and contingently responding to a peer's initiations. Though social stories contained an example of each of the four target skills, during intervention sessions and generalization probes the majority of each student's social behaviors were comments and contingent responses. Each of the three target students displayed low rates of seeking attention behaviors and requests throughout the study. Each child's performance is discussed in reference to the total number of target social skills displayed per session across each phase of the study.

As shown in Figure 2, Derrell displayed few target social skills during baseline sessions. Anecdotal notes report that he sometimes "babbled" in response to peer initiations, but his words were not comprehensible at these times. After the social story intervention was introduced,
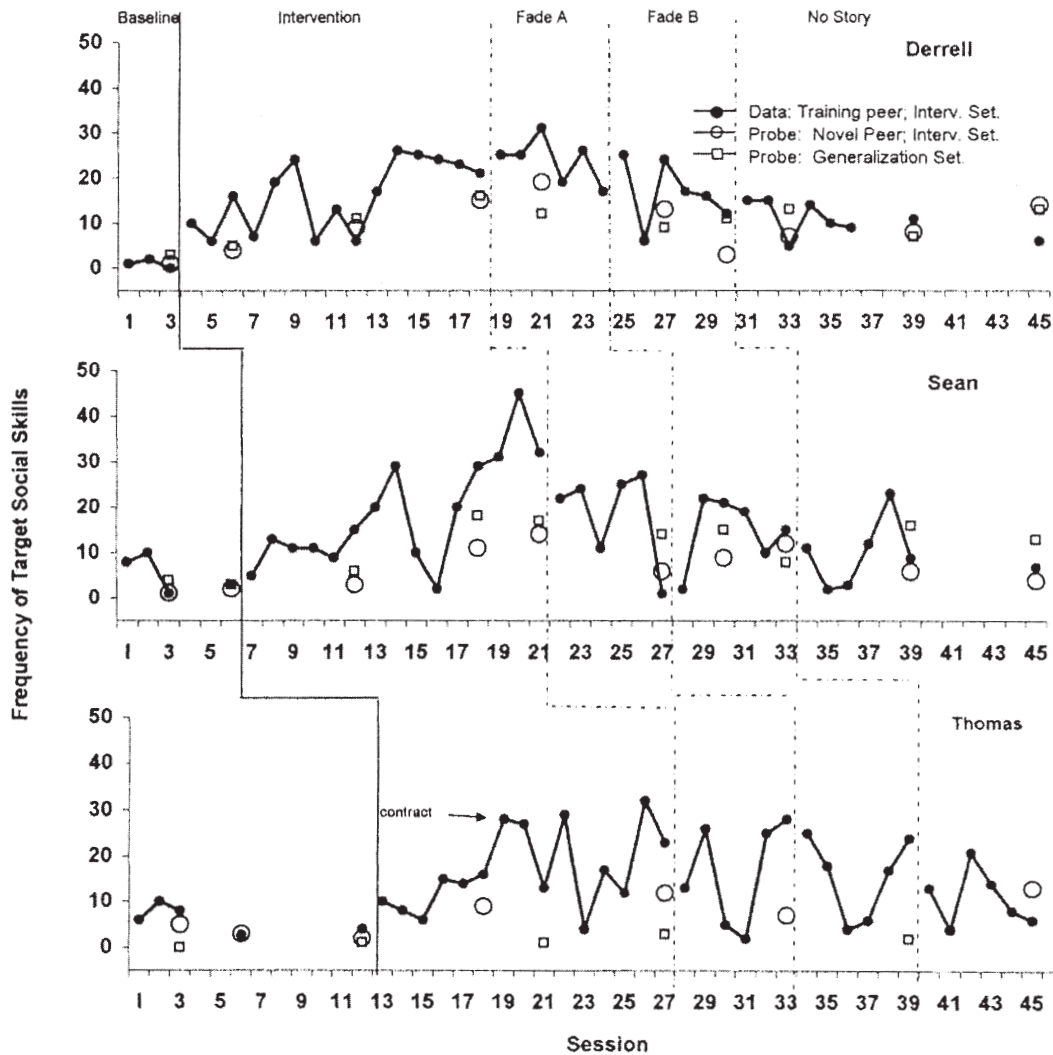
Figure 2. Frequency of target social skills during 10-min sessions: seeking attention, comments, requests, contingent responses.
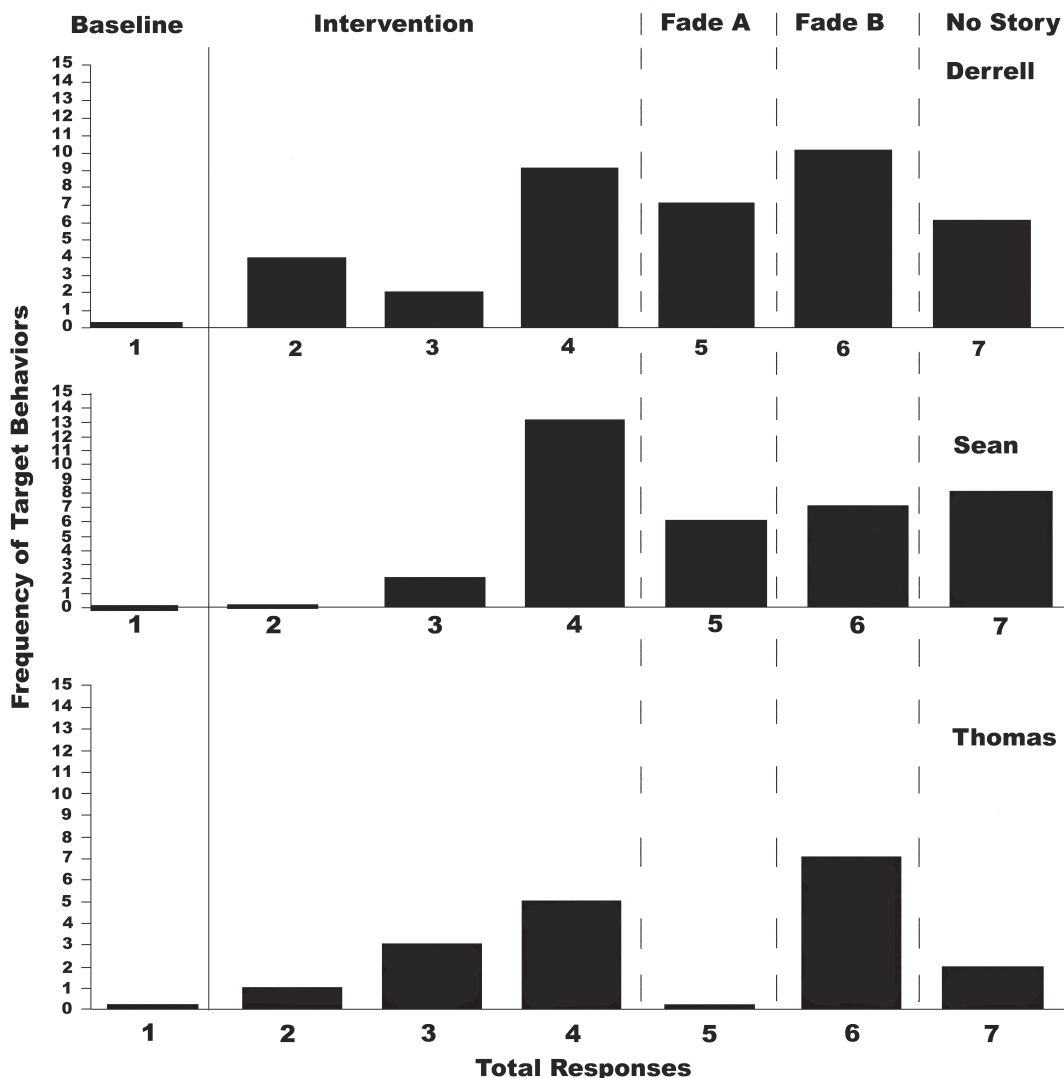
Derrell's performance improved and there was a change in the trend of the data, from decelerating during the baseline phase to accelerating during the intervention phase. However, Derrell's performance during intervention remained variable, and the total frequency of target behaviors across the four behaviors ranged from 6 behaviors to 26 behaviors. As the treatment was gradually faded, Derrell continued to demonstrate improvement over baseline performance, but the data trend became decelerating. Two follow-up probes were conducted approximately 1 and 2 weeks after the no-story phase; Derrell displayed a total of 11 and 6 target behaviors, respectively.

Derrell exhibited a similar pattern of behavior during play sessions with a novel peer in the intervention setting. He displayed one target behavior with a novel peer during a baseline probe. After the introduction of intervention, his performance with the novel peer gradually improved

and he displayed a range of 4 to 15 target social skills. An increase in the frequency of target skill use was also observed during learning centers in Derrell's kindergarten classroom. Derrell displayed three target social skills during baseline. After the start of the social story intervention, he displayed a range of 5 to 16 target social behaviors per session. As was the case in the intervention setting, the majority of Derrell's target social behaviors were comments and contingent responses.

Figure 3 illustrates the frequency of target behaviors during covert probes. Derrell displayed no target skills during the first covert probe, but after intervention was introduced he exhibited a range of 2 to 10 target skills per session.

As shown in Figure 2, Sean displayed a range of 1 to 10 target social skills during baseline sessions. After the social story intervention was introduced, Sean's performance

Figure 3. Frequency of coded social skills during 5-min covert probes in the intervention setting.

improved and there was a change in the trend of the data, from decelerating during the baseline phase to accelerating during the intervention phase. However, Sean's performance during intervention remained variable, and the frequency of target behaviors ranged from 2 behaviors to 45 behaviors. In addition, about one quarter of the intervention data points overlapped with baseline. As the treatment was gradually faded, Sean continued to demonstrate improvement over baseline performance, but the level of data dropped and the data path remained variable. One follow-up probe was conducted approximately 1 week after the no-story phase ended, and Sean displayed a total of seven target behaviors.

Sean showed some evidence of generalization during play sessions with a novel peer in the intervention setting. He displayed a total of three target behaviors during two baseline probes. After the introduction of intervention, his

performance with the novel peer gradually improved, and he displayed a range of 3 to 14 target social skills. An increase in the frequency of target skill use was also observed during learning centers in Sean's kindergarten classroom. Two probes were conducted during baseline; Sean displayed four target social skills during the first probe and three target skills in the second probe. After the start of the social story intervention, he displayed a range of 6 to 17 target social behaviors per session. One follow-up probe was conducted about a week after the last session in the no-story condition, and Sean displayed 13 target behaviors. As was the case in the intervention setting, the majority of Sean's target social behaviors were comments and contingent responses.

Figure 3 illustrates the frequency of Sean's target behaviors during covert probes. Sean displayed no target skills during the first two probes and only two target social

skills during the third covert probe. Immediately following the third covert probe, the experimenter asked Sean and his peer why they had been so quiet. They told the experimenter that they thought they were supposed to be quiet until she was ready to start the session. The experimenter told the students that it was fine to talk if they were waiting before a session started. During the remaining covert probes, Sean displayed a higher rate of target social behaviors with a range of 6 to 13 behaviors.

As shown in Figure 2, Thomas displayed few target social skills during baseline sessions. Anecdotal notes report that he did seek the experimenter's attention but rarely interacted with his peer. After the social story intervention was introduced, Thomas's performance improved and he displayed a range of 4 to 32 target social behaviors per session. However, Thomas's performance became variable after the sixth intervention session and remained variable for the remaining phases of the study.

Thomas participated in seven play sessions with a novel peer. He displayed fewer than five target behaviors during three baseline probes. After intervention began, his performance with the novel peer improved and he displayed a range of 7 to 13 target social skills per session. Thomas did not demonstrate generalization to the classroom setting. He was observed on five occasions during an afternoon break in his second-grade classroom. In the classroom setting, Thomas displayed a low rate (range = 1 to 3) of target behavior across all study phases.

Figure 3 illustrates the frequency of Thomas's target behaviors during covert probes. Thomas displayed no target skills during the first probe, and he showed a gradual improvement during the three intervention probes. However, as the intervention was gradually faded, his performance was inconsistent.

Discussion

Research evaluating the effects of the social story intervention has a short history. To date, only four other studies have evaluated the use of social stories and directly measured social skills. Only one of these four studies (Thiemann & Goldstein, 2001) met rigorous design standards (e.g., Campbell & Stanley, 1966). The present study evaluated the application of a social story intervention to increase the amount of time students with autism spent socially engaged with peers and to increase their use of four target social skills. The social stories developed for this study contained an example of each of the four target social skills and consequently were longer than the stories used in the study by Thiemann and Goldstein. Following implementation of the social story intervention, all three participants showed an increase in the duration of time they spent socially engaged with both a training peer and a novel peer in the intervention setting. Derrell and Sean demonstrated gains in their general education classroom setting, sometimes reaching levels of engagement that approached the levels of engagement of their nondisabled peers.

Though Thomas showed generalized treatment effects with a novel peer in the intervention setting, his performance in the general education classroom did not improve. This lack of setting generalization in Thomas's case may suggest that there was not enough similarity between the intervention setting conditions and the actual classroom conditions.

The three students also exhibited an increase in their use of the target social behaviors. However, students primarily relied on two of the target skills: contingent responding and initiating comments. Again, Derrell and Sean demonstrated gains in the classroom setting, and Thomas made improvement in the intervention setting only.

The maintenance data were somewhat unclear. As the intervention was gradually faded, the three participants maintained levels of engagement that were greater than their baseline performance, but each student's performance was variable.

This study adds to the literature in several ways. First, unlike Thiemann and Goldstein's (2001) study, which applied the social story intervention as one part of a larger treatment package, the social story was the main intervention introduced by the researchers in this study. Second, a multiple-baseline experimental design was employed in the current study. To date, many investigations of social stories (e.g., Norris & Dattilo, 1999; Swaggart et al., 1995) have used nonexperimental designs that are plagued by threats to internal and external validity. This study also adds to the small but growing body of literature evaluating the effects of visual support strategies on the social-communication skills of children with autism (e.g., Charlop-Christy & Kelso, 2003; Keeling, Myles, Gagnon, & Simpson, 2003; Krantz & McClannahan, 1998; Sarokoff, Taylor, & Poulson, 2001). Overall, the findings of this study suggest that the use of social stories with children with autism may lead to the benefits of increased social engagement with peers.

These findings also have several implications for practice. First, though most of the research on social stories has investigated the use of the intervention to decrease challenging behaviors, this study found social stories effective in increasing positive behaviors. Therefore, practitioners may find social stories appropriate for both decreasing challenging behaviors and increasing specific prosocial behaviors. Second, the intervention activities used with Derrell and Sean were very similar to the activities found in their classrooms, and this likely contributed to their skill generalization. Though the activities used in intervention sessions with Thomas were age appropriate, they were not always available during the afternoon break in Thomas's classroom, where students more often just sat and talked instead of engaging in a specific activity. This difference between intervention setting and classroom setting may in part explain Thomas's lack of generalization. This finding

underscores the importance of carefully planning for generalization and suggests that separate "intervention settings" be exchanged for intervention as a natural part of the classroom routine. Finally, it is important for practitioners to exercise caution in the use of social stories and to carefully evaluate the effects of the intervention on students. Though social stories are relatively easy to write and implement in inclusive settings, only a small pool of studies remain that have rigorously evaluated the effectiveness of this intervention.

It is important to note several limitations to this investigation. First, several issues prevented the researchers from evaluating social stories as the sole independent variable in this study. For example, during the course of the study, two of the three students (Derrell and Thomas) were participating in a discrete trial program focusing on language and academic skills that had been in place for more than a year prior to the study. It is impossible to know if these two students would have responded to the social story intervention in the same manner had they not been participating in these programs. In addition, Thomas began using a behavioral contract that reinforced social behavior midway through the investigation. Finally, the training peers in this study received the social story intervention with the children with autism. The social stories may have served as training for the peers to interact with the children with autism, thus adding a peer-mediated feature to the intervention. Though data were not collected on training peers' behavior, the social stories likely affected their behavior during play sessions.

A second limitation involves the generalizability of the study's results to other children with autism and to other behaviors not included in this investigation. All of the participants in this study had functional verbal language, at least beginning reading skills, and very low rates of inappropriate behavior. Therefore, it is unclear if the intervention would be effective with children having fewer verbal and reading skills and higher rates of inappropriate behavior.

Finally, the length of the intervention phase was a limiting factor. All students started the fading phase after 15 intervention sessions because their performance was at least 40% greater than the mean of their baseline performance. However, both the trend and the level of the data path were unstable for each child, suggesting that the criterion to shift to the fading phase may not have been appropriately stringent. Also, to support the maintenance of skills, it may have been useful to continue the intervention phase for a longer period of time.

These findings suggest several areas for additional research. First, there is a need for studies examining the use of social stories to increase prosocial behaviors. It would be useful if some of these studies evaluated social stories alone and not as part of a larger treatment package. It also would be valuable to examine how the social story benefits

older children. The three participants in this study were between 6 and 9 years of age. Future research efforts adapting the intervention for middle and high school students would be beneficial. In addition, the possible role of peers in the social story intervention should be further evaluated. Much of the literature on social skills suggests the benefits of peer involvement in social skills intervention for children with autism. For example, Lee and Odom (1996) trained peers without disabilities to make social initiations to two children with autism who engaged in high rates of stereotypic behavior. When peers made initiations, target children's rates of social interaction increased and decreases in stereotypic behavior were observed. Laushey and Heflin (2000) reported positive results when creating a peer buddy program in which classmates of students with autism were taught how to interact and play with a buddy with autism. In the current study, a peer also received the social story intervention with the child with autism. This may have enhanced the effectiveness of the social story intervention. Additional research could explore this issue by collecting data on peer behavior and comparing the effects of reading the social story to the child with autism alone and reading the social story to the peer and the child with autism.

Another research need relates to the specific target skills. This study focused on the same four target skills used by Thiemann and Goldstein (2001). Though the social stories contained an example of each target skill, during intervention sessions and generalization probes the majority of each student's social behaviors were either comments or contingent responses. Students demonstrated low rates of initiation requests and attention-seeking behaviors. This finding is disappointing because these two behaviors are critical in social relationships and involve making overtures to others—an area particularly deficient for children with autism (Hauck, Fein, Waterhouse, & Feinstein, 1995). The data from this study do not suggest an explanation as to why comments and contingent responses were positively affected and initiating requests and attention seeking were unchanged. Future research should investigate this finding and also determine which social skills may be most useful to older students.

The issue of maintenance is also an important area in need of additional research. Because the issue of maintenance has not been fully explored in previous research on social stories, the researchers in the current study set somewhat arbitrary criteria (e.g., after 15 intervention sessions and performance at least 40% greater than the mean of baseline performance) to guide the process of fading the social story intervention, which resulted in a decrease in target behaviors during the maintenance phase of the study. Perhaps future researchers should require a longer intervention period and use social comparison data instead of baseline performance to set a criterion. Also, Gray (2000) cautioned that fading may not always be appropri-

ate but provided some suggestions for fading social stories. One of Gray's strategies involves rewriting the social story and omitting directive sentences or parts of directive sentences. This would provide an opportunity for the target child to recall key information without fading the entire story. Another strategy suggested by Gray is to increase the amount of time between readings of the social story. Future researchers might examine both of these techniques.

In addition to research related to specific target skills and maintenance, it is important that research investigating the use of social stories to improve social engagement be conducted in a variety of home and community settings. The present study and the other four studies that evaluated the effects of social stories on social skills (Barry & Burlew, 2004; Norris & Dattilo, 1999; Swaggart et al., 1995; Thiemann & Goldstein, 2001) were school based. The inability to develop normal social relationships is perhaps the single most defining feature of autism (Kanner, 1943). This profound difficulty in relating to others dramatically affects a child's family life and community participation. Therefore, there is a great need for intervention research addressing social functioning in these nonschool environments. Because social stories are best developed by people who know the child well, and because they are relatively easy to implement, this intervention may be especially well suited to family and community settings.

As well as future research implications pertaining specifically to the findings of the present study, there continues to be a need to evaluate the components of the social story intervention separately. Hopefully, future research efforts will determine which of Gray's (2000) guidelines are critical to the effectiveness of the intervention, and which are unnecessary. Such research is important because although the results of the initial pool of studies are promising, the social story intervention was based on anecdotal evidence and one individual's clinical experience and knowledge of people with autism, rather than on empirical evidence. Research identifying the critical components of a social story would ensure that students have access to the most effective interventions, and that their teachers could design these interventions with more precision.

In conclusion, this study evaluated the effects of social stories on the social engagement of three young children with autism. Following the intervention, the duration of social engagement increased during play sessions, and students demonstrated a higher rate of target social skills. Two students generalized these gains to their general classroom setting. These findings suggest that the use of social stories without additional interventions is effective in increasing the duration of social engagement with peers and the frequency of initiating comments and responding to peer initiations. Additional research is needed to explore issues raised by this investigation and to further examine the components of the social story intervention.

ABOUT THE AUTHORS

*Monica Delano, PhD, is an assistant professor in the College of Education at Florida State University. Her research interests include social and academic supports for students with autism, inclusion, and adolescent issues. **Martha E. Snell**, PhD, is a professor at the Curry School of Education in the Department of Curriculum, Instruction, and Special Education. Her research interests lie in early communication of individuals with severe disabilities, inclusion, and instructional methods. Address: Monica Delano, College of Education, Florida State University, 205 Stone Building, Tallahassee, FL 32306; e-mail: delano@coe.fsu.edu*

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Increasing Appropriate Social Interactions of Children With Autism Spectrum Disorders Using Social Stories™

Dorothy Scattone, Daniel H. Tingstrom, and Susan M. Wilczynski

To date there are more than one dozen studies that validate the use of Social Stories™ as an effective behavioral intervention. Many of these studies focused on decreasing inappropriate behaviors (e.g., aggression, screaming, and grabbing toys), and most combined Social Stories with another intervention. The present study used a multiple baseline design across participants to investigate the effectiveness of Social Stories when used as a sole intervention to increase the appropriate social interactions of 3 children with autism spectrum disorders toward peers both with and without disabilities. During baseline, participants demonstrated few appropriate social interactions, although all had some functional expressive language. An increase in appropriate social interactions occurred for 2 of the participants after the intervention was implemented. These findings suggest that Social Stories may be effective for some children with autism spectrum disorders; however, the population they best serve has not yet been fully identified.

The impairment in social interaction that characterizes children with autism spectrum disorders (ASD) is severe and profound and may manifest itself in language, play, eye contact, and gestures (Kanner, 1943). Although many strategies successfully address this core deficit, a majority of these procedures require intrusive adult prompts, extensive time to train teachers and peers (Gonzalez-Lopez & Kamps, 1997; Zanolli, Dagget, & Adams, 1996), and, in some cases, the presence of an expert (K. Pierce & Schreibman, 1997). An intervention that is relatively simple for teachers and practitioners to implement is called Social Stories™ (Gray, 1998).

Social Stories are individualized short stories that may increase appropriate social interactions of children with ASD by teaching them the relevant components of a given social situation (Gray, 1998; Gray & Garand, 1993). They focus on describing and explaining the cues in that situation as well as teaching appropriate responses. Gray (2004) has suggested that the most successful stories adhere to a specific format and guidelines (see Appendices A and B). According to Gray (1998), Social Stories have been used to decrease fear, aggression, and obsessions; introduce a change in routine; teach academic skills; and teach appropriate social behavior; however, Gray herself has not empirically validated their use.

Social Stories are similar to other interventions, including self-management (i.e., K. L. Pierce & Schreibman, 1994) and written scripts (Krantz & McClannahan, 1993, 1998) because they identify necessary components of a given social situation in a written format. In addition, like self-management and scripting, Social Stories transfer stimulus control from the teacher and peers directly to the child with autism. Furthermore, Social Stories share similarities with priming strategies (Zanolli, Daggett, & Adams, 1996) because they "prime" the appropriate responses to a given social situation just before the social situation takes place.

Over the past 10 years, researchers have shown Social Stories to be successful when applied to a wide variety of problem behaviors including aggression, screaming, grabbing toys, using inappropriate table manners, and crying (Kuoch & Mirenda, 2003; Rowe, 1999; Scattone, Wilczynski, Edwards, & Rabian, 2002). Swaggart and colleagues (1995) were the first to empirically validate this intervention by teaching a young girl with autism appropriate greeting behavior and two boys—one with autism and one with a pervasive developmental disorder—how to share. Swaggart and associates observed a reduction in aggression as well as an increase in appropriate greetings and sharing for these participants. Researchers have also found Social Stories to be effective in decreasing tantrums (Kuttler, Myles, & Carlson, 1998; Lorimer, Simpson, Myles, & Ganz, 2002), cheating, and negative comments when playing games. These behavior changes may be maintained over time (Kuoch & Mirenda, 2003).

Scholars have also used some rather unique adaptations of the Social Story format. Moore (2004) developed Social Stories in order to assist a young child to sleep in his own bed. Brownell (2002) adapted the Social Story texts to an original tune and sang them with a guitar accompaniment to four participants in order to improve problem behaviors (i.e., loud vocalizations, scripting, and repeating instructions). Brownell found that Social Stories were just as effective when sung as they were when read to these participants.

Researchers have also investigated the effectiveness of Social Stories for skill acquisition. Hagiwara and Myles (1999) adapted Social Stories to a computer-based format in order to teach hand washing to two participants and on-task behavior to another. However, they observed only modest improvements from baseline to intervention. Barry and Burlew (2004) taught play skills and choice to two participants with severe autism. Improvements occurred, and the participants learned to play appropriately with materials and peers. Ivey, Heflin, and Alberto (2004) successfully taught three children with Pervasive Developmental Disorder–Not Otherwise Specified (PDD–NOS) to prepare for novel activities, including having a birthday party, making a purchase, and playing with unfamiliar toys.

Investigators have also examined Social Stories as a means for improving social interactions for children with autism. Norris and Dattilo (1999) created Social Stories in order to improve a young girl's initiations and responses to peers during lunchtime. They developed three Social Stories that included picture prompts, and each day they randomly selected and read to her one of these stories. Although inappropriate verbalizations decreased, all social interactions also decreased, suggesting either that the varied content of the Social Stories made it difficult for the participant to focus on more than one instruction or that Social Stories may need to be part of a treatment package that includes other interventions when targeting behavior as complex as social initiations and responses.

Many studies have combined Social Stories with other interventions, including verbal and pictorial prompts, behavior charts, reinforcement for appropriate responding, and, in one case, a social skills training methodology and a response cost system (Swaggart et al., 1995). Thiemann and Goldstein (2001) used a treatment package in their Social Story intervention for targeting conversation skills (i.e., initiations, requests, responses, and securing attention) for five participants with autism. They combined the Social Stories with verbal prompts, pictorial cues, and self-evaluative video feedback. The treatment package was effective for developing these skills, and Thiemann and Goldstein observed some generalized treatment effects across untrained behaviors. However, they did not assess individual components of the package, making it difficult for other researchers to determine the exact role that Social Stories played in the improvements for the participants.

Scattone et al. (2002) investigated the use of Social Stories as a sole intervention without the use of verbal or pictorial prompts or another intervention for three participants with autism. A reduction in disruptive behaviors (i.e., chair tipping and staring) occurred for two of the three participants. However, improvements for the third participant (i.e., regarding shouting) were modest at best.

To date, many of the studies involving Social Stories have been undertaken with the aim of reducing isolated inappropriate behaviors, with some investigations targeting skill acquisition and increases in appropriate social interactions. Also, many of these previous studies have included other interventions or components in addition to Social Stories. The present investigation focused on building and increasing appropriate social behaviors rather than decreasing behaviors by using Social Stories as a sole intervention. In addition, the present study aimed to correct some of the limitations of a previous study (Norris & Dattilo, 1999) that attempted to promote appropriate social interactions. This was accomplished by administering only one Social Story to each participant. Thus, the present study was designed to evaluate the effectiveness of Social Stories in increasing the appropriate social interactions of children with ASD toward their peers when used without other systematic behavioral intervention(s).

Method

Participants

Three boys between the ages of 8 and 13 years who had been previously diagnosed with an ASD participated in the study. These students were selected because they did not initiate or respond to peers either appropriately or at all during free-time activities, according to teacher report. Each student was a member of a self-contained special education classroom or a general education classroom at an elementary or middle school in the southern United States. All students had intelligible speech and were capable of speaking in complete sentences. Written permission was obtained from the parents of each participant.

Steven. Steven, an 8-year-old boy, was a member of a self-contained special education class consisting of one teacher, one assistant, and four other students with developmental disabilities. His peers were approximately the same age and had cognitive delays, but none had autism. Steven's academic curriculum consisted mainly of kindergarten class work, including identifying shapes and colors, learning to count, and developing pre-reading skills. Steven had not yet written his name or completed simple addition or subtraction problems.

Although he was capable of speech, Steven had difficulty with conversation skills and did not initiate or maintain conversations with others. Although he did not elaborate on topics, he could answer simple questions such as "What do you want to play with?" In addition, he was capable of labeling items when they were held up in front of him and he was asked, "What's this?" His self-help skills were good, and he was capable of independently toileting, feeding, and dressing with some assistance with buttons and zippers.

Steven was seldom observed interacting appropriately with peers during unstructured free-time activities (i.e., recess), and he often isolated himself in a corner of the classroom, where he usually exhibited stereotypical behavior (e.g., playing with rolled paper) or screamed and threw toys. Occasionally he sat with peers while they engaged in an activity (e.g., coloring, building with blocks); however, generally he did not either initiate or respond to them.

Steven's intelligence quotient (IQ), as measured by the *Kaufman Assessment Battery for Children* (Kaufman & Kaufman, 1983), yielded a mental processing composite of 67. His score on the *Diagnostic Achievement Battery–Second Edition* (Newcomer, 1990) yielded a word knowledge score of 60, a story comprehension score of 65, and a math reasoning score of 65. He received a diagnosis of autistic disorder through an area school in conjunction with a local university's School Psychology Service Center and was referred to the center for treatment.

Steven lived in a lower–middle class, single-parent home. His mother was a high school graduate and did not work outside the home. Steven did not have any siblings. Steven's mother reported that he often had difficulty with change and became upset when things in the environment, including the living room furniture, were moved. She also reported that he did not interact much with extended family members and often preferred to play alone.

Steven was not yet able to read fluently; therefore, his teacher read his Social Story to him once daily approximately 5 min prior to his unstructured free-time activity (i.e., recess).

Drew. Drew, a 13-year-old boy, was a member of a general education class for most of the day and received special education supports for math. According to his teacher, he was a B average student. Drew was capable of requesting help and information and responding to questions directed to him by peers and adults. He had some ability to converse and was capable of elaborating on a topic; however, he was not observed initiating or responding much to others. He was independent with self-help skills but was not adept at sports and experienced poor motor coordination with running, catching a ball, and handwriting.

Drew sometimes initiated socially to peers during unstructured free-time activities (i.e., lunch); however, his initiations were infrequent and consisted mainly of inappropriate comments (e.g., animal noises) or inappropriate gestures (e.g., rubbing his stomach, shaking his bottom). Although Drew's peers attended general education classes and none of them had autism or other developmental disabilities, they often encouraged his inappropriate behavior with laughter. Drew was able to follow rules and lined up with the other students for lunch. In addition, he independently bought his lunch at the counter and then sat at one of the several small tables in the cafeteria with peers.

Drew was an only child who lived with his parents in a middle-class area. His mother was a high school graduate, and his father had some college education. Both parents worked outside of the home. Drew's mother reported that Drew enjoyed swinging alone in the backyard for hours. She also reported that he had difficulty with peer relations and did not appear to understand the rules governing social behavior. Drew did not have friends and spent much of his time alone.

Drew's IQ composite, as measured by the *Universal Nonverbal Intelligence Test* (Bracken & McCallum, 1996), yielded a full-scale IQ of 95. His reading composite score was 91, and his math composite score was 74 as measured by the *Kaufman Test of Educational Achievement* (Kaufman & Kaufman, 1985). An outside agency had diagnosed Drew with autistic disorder and referred him to the local university's School Psychology Service Center for treatment.

Drew read his Social Story to his teacher once daily 5 min before his unstructured free-time activity (i.e., lunch).

Billy. Billy, an 8-year-old boy, was fully integrated into a general education first-grade classroom with at least 20 other students, one teacher, and one assistant. He was the only student in the class with a developmental disability. Billy was independent with most self-help skills (including feeding and toileting) but experienced some fine-motor difficulties (especially with holding a pencil and fastening buttons). Billy was sometimes noncompliant with task demands and needed frequent prompting in order to complete assignments and follow classroom rules.

Billy was capable of requesting items and help and answering questions from adults and peers, but he did not elaborate on topics or initiate and respond appropriately. For example, during free time (i.e., recess), he either isolated himself or engaged in stereotypical behavior (e.g., circling the perimeter of a tree and talking to himself while waving a stick). Peers often attempted to interact with him and engage him in conversation; however, he generally either walked away or sat with them without responding. If Billy responded, it was usually with an inappropriate comment (e.g., "Shut up," "Go away"). In addition, Billy often recited the dialogue of many of his favorite Disney movies to his peers without an awareness of whether they were interested or whether they wanted to interject a comment.

Billy was an only child who lived in a two-parent, middle class home. Both parents had some college education. His father was employed, whereas his mother was not employed outside the home. Billy was undergoing chelation therapy for the removal of heavy metals (including mercury and lead) at the time the study was conducted; however, medical treatment had been underway for 2 months prior to the beginning of the study.

Billy's IQ, as measured by the *Kaufman Assessment Battery for Children* (Kaufman & Kaufman, 1983), yielded a mental processing composite of 95. His screener composite score on the *Wechsler Individual Achievement Test* (Wechsler, 1992) was 107, with a score in reading of 109, a score in math reasoning of 91, and a score in spelling of 116. An outside agency

had diagnosed Billy with Asperger syndrome and referred him to the local university's School Psychology Service Center for treatment.

Although Billy was capable of reading, he read extremely slowly and did not enjoy reading; therefore, his teacher read the Social Story to him once daily 5 min before his unstructured free-time activity (i.e., recess).

Setting

Although there were slight differences across specific settings, all were similar types of free-time activities (i.e., lunch or recess) during the school day. Sessions were held at the same time and place each day. Steven's unstructured free-time activity was held in his classroom. Drew's unstructured free-time activity was held in the cafeteria after Drew and his peers had finished eating their lunches. Billy's unstructured free-time activity was held outdoors in a small area just outside his classroom. Only one session per student occurred each day.

Social Stories

For each participant, the first author developed an individualized Social Story (see Appendix C) that described some aspect of free time; the third author reviewed the stories for adherence to Gray's (1998) Social Story construction guidelines. Each Social Story provided the participant with the appropriate social initiations and responses he was expected to make to his peers during that free-time activity. The first author wrote into the stories appropriate social interactions that consisted of initiations and responses that she had previously observed typical peers to make during those free-time activities. These Social Stories were designed to increase the quantity of the children's appropriate social interactions with peers.

The pages of each Social Story were typed on white paper using a 14-point font, mounted onto black construction paper, and compiled into a book-like format that was spiral bound at the top. One or two sentences were placed on each page. The first author wrote the Social Stories in the first person. In an effort to isolate the effects of the Social Stories when used alone, their use was not combined with the use of other interventions, including illustrations.

Design

A multiple baseline design across participants was used in order to assess changes in social interaction skills (Hayes, Barlow, & Nelson-Gray, 1999) during free-time activities. Initially, baseline data were collected simultaneously for all participants. Baseline conditions were identical to those of the intervention during previously described free-time activities (i.e., lunch or recess). Teachers were instructed to respond to the children in their usual manner during both baseline and intervention phases. The Social Story was introduced to Steven after three stable data points had been obtained and while baseline data were collected for Drew and Billy. The Social Story was introduced to Drew after Steven's intervention had been in place for 3 weeks, although no stable treatment effect had yet occurred. This decision was based on the practical and ethical considerations of avoiding an overly extended baseline period for Drew; baseline data continued to be collected for Billy. Finally, the Social Story was introduced to Billy after five data points that documented improved social interactions for Drew had been collected.

Procedure

Data Collection and Interobserver Reliability. For all participants, an *appropriate social interaction* was defined as a verbal, physical, or gestural initiation or response to a peer (e.g., tapping shoulders, handing something to a peer, or receiving something from a peer); a comment or question related to the activity or conversation; continued engagement in the same activity as the peer (e.g., both drawing); a response to a peer's comment or question with a comment related to the conversation; an initiated comment or question related to the conversation; or a physical gesture such as nodding to indicate approval or disagreement.

The first author trained graduate students in data collection procedures on social interactions by having them observe another nonparticipating student with ASD at an elementary school during a free-time activity. Observer training continued until interobserver agreement reached 80% on two consecutive training observations.

Trained observers collected baseline and intervention data on social interactions during one 10-min free-time activity per student 3 days per week for approximately 11 weeks. Observers collected data during the first 10 min of the activity period for Steven and Billy and immediately after Drew and his peers had finished eating their lunches. Baseline data were collected for 3 days for Steven, 14 days for Drew, and 16 days for Billy. Billy was absent during four scheduled baseline observations.

Observers used a partial-interval recording procedure in order to record behavioral observations. An audiotape cued the observers every 10 s to record the occurrence of the target behaviors. During each observation, observers simply marked each interval in which an appropriate social interaction occurred according to the definitions described at the beginning of this section. Data for all participants were collected during the described free-time activities.

Interobserver agreement was measured by assessing the levels of agreement and disagreement during at least 33% of the observations for each participant during both baseline and intervention sessions and was expected to be at least 80%. *Agreement* was defined as occasions when both observers agreed that an appropriate social interaction either occurred or did not occur. *Disagreements* were scored if the observers did not agree on the occurrence of an appropriate social interaction during an interval. Percentages of interobserver agreement was computed by dividing the number of agreements by

the total number of agreements plus disagreements and multiplying by 100%.

Interobserver agreement occurred 14 times for Steven (representing 42% of the observations), 12 times for Drew (representing 36% of the observations), and 11 times for Billy (representing 33% of the observations). For Steven, the mean level of interobserver agreement for appropriate social interactions was 99% (range = 98%–100%). For Drew, the mean level of interobserver agreement was 93% for appropriate social interactions (range = 80%–100%). For Billy, the mean level of interobserver agreement was 88% for appropriate social interactions (range = 83%–100%).

Teacher Training. An experimenter and each teacher together decided the best location in which to read each Social Story. The experimenter then demonstrated how the Social Story should be read and had each teacher practice or role-play the procedure. The examiner judged each teacher competent to implement the intervention after the teacher had successfully completed one trial without an error during training.

Intervention. During the first session of the intervention phase, a teacher read a Social Story to each participant. The teacher sat next to and slightly behind the participant in a portion of the classroom away from the other students. The teacher assessed the participant's comprehension of the story by asking him a set of predetermined comprehension questions (see Appendix C) the first time the Social Story was introduced. These questions were typed on a separate sheet of paper and given them to the teacher. All participants were expected to answer the comprehension questions once with 100% accuracy. If this did not occur, the teacher reread the Social Story and explained the correct answers until the participant was able to answer all questions accurately.

The comprehension questions were on a separate sheet of paper that the teacher removed after each respective student answered all questions correctly once. Thus, the teacher administered the questions once for Drew and twice for Steven and Billy. The teacher read the Social Story to Steven two times and repeated the comprehension questions twice before he was able to answer them accurately. Drew was able to answer the questions the first time the teacher introduced the Social Story. Billy also required the teacher to ask the comprehension questions two times and needed prompting to answer them.

Thereafter, each participant read the Social Story to his teacher (i.e., Drew) one time per day just prior to the free-time activity. If the participant was not yet able to read (i.e., Steven) or read slowly (i.e., Billy), the teacher read the Social Story to him one time per day just prior to the free-time activity. Observers collected data during intervention in the same manner as during baseline.

Treatment Integrity. Teachers were instructed to have each participant read the Social Story one time per day, 5 days per week, just prior to their scheduled free-time activity. Teachers were instructed to review the Social Story with the participant in either a separate room or an isolated corner of the classroom away from distractions. The participants' teachers recorded whether the participant read the Social Story or was read the Social Story at the specified time that day. They also made notes as to whether the student asked questions or made any other comments during the reading of the story. Furthermore, the teachers were instructed not to prompt participants to interact with their peers in any way.

During the intervention sessions, an experimenter was present 3 days per week and recorded whether the Social Story was read by or to the participant at the specified time. The experimenter also corrected any procedural errors when and if they occurred, although the few errors that may have occurred were not represented as procedural steps in treatment integrity recording. The teacher was responsible for making sure the Social Story was read at the specified time the other 2 days per week, and no examiner verified treatment integrity on those 2 days. Treatment integrity was stated as a percentage and calculated by dividing the number of days the participant read or was read the Social Story by the number of total days in the intervention phase and multiplying by 100%.

Treatment integrity was 100% for Steven and Drew. Treatment integrity was 86% for Billy; after the first time Billy's teacher failed to implement the intervention on one of the days the experimenter was not present, the experimenter left messages daily for the remainder of data collection to remind the teacher to read the Social Story to him. Billy's teacher confirmed with the experimenter that she had received the messages.

Data Analysis

The effectiveness of the intervention was assessed on participants' social interactions by measuring the percentage of intervals of appropriate social interactions exhibited by each participant during 10-min observations across baseline and intervention phases. Appropriate social interactions were graphed for each participant daily as a percentage of intervals. Changes in level, variability, and trend for data points were inspected visually during baseline and intervention phases (Hayes, Barlow, & Nelson-Gray, 1999; Kazdin, 1982).

Results

Appropriate social interactions (see Figure 1) for Steven did not change after the introduction of the Social Story. The mean level of appropriate social interactions during baseline was 1% of intervals (range = 0%–3%) and 4% (range = 0%–65%) during intervention. Steven was absent during one scheduled intervention session.

Drew demonstrated the largest increase in appropriate social interactions during intervention (see Figure 1). For Drew,
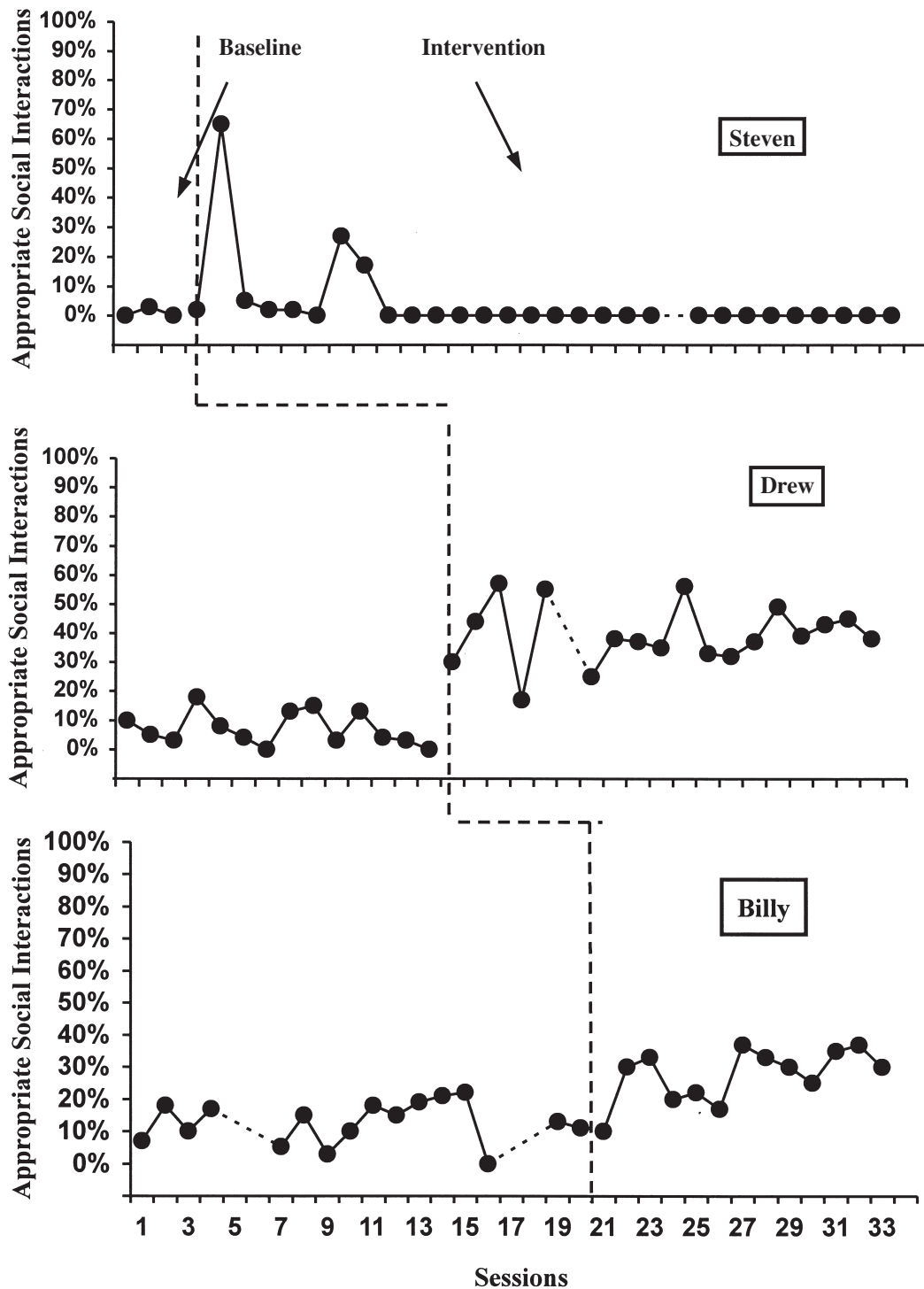
FIGURE 1. Percentages of appropriate social interactions across phases for Steven, Drew, and Billy.

appropriate social interactions ranged from 0%–18% of intervals during baseline (M = 7%). Throughout the intervention phase, appropriate social interactions ranged from 17% to 57% of intervals (M = 39%). Drew was absent during one scheduled intervention session.

For Billy, percentage of intervals of appropriate social interactions during baseline ranged from 0% to 22% (M = 13%; see Figure 1). Appropriate social interactions during intervention increased somewhat and ranged from 10% to 37% of intervals (M = 28%).

Social Validity

Acceptability of the Social Story intervention was assessed at the conclusion of the study by having each participant's teacher complete the *Intervention Rating Profile* (IRP-15; Martens, Witt, Elliott, & Darveaux, 1985). The IRP-15 is a 15-item scale that has been used widely to evaluate teachers' acceptability of interventions (e.g., Doggett, Edwards, Moore, Tingstrom, & Wilczynski, 2001; Ford, Olmi, Edwards, & Tingstrom, 2001; Marlow, Tingstrom, Olmi, & Edwards, 1997; Scattone et al., 2002; Umbreit, Lane, & Dejud, 2004). The established reliability of the IRP-15 is .98 (Martens et al., 1985). Scores on the IRP-15 can range from 15 to 90, with higher scores indicating greater acceptance of interventions. Scores higher than 52.50 indicate that the teacher finds an intervention acceptable (Von Brock & Elliott, 1987). Teacher responses on the IRP-15 were 55 for Steven, 78 for Drew, and 68 for Billy. All scores fell well within the acceptable range.

Percentage of Nonoverlapping Data

To assess intervention effectiveness, the percentage of non-overlapping data (PND) for appropriate social interactions between phases was computed by dividing the number of data points in intervention that did not overlap with data points in baseline by the total number of data points in the intervention phase. Scruggs, Mastropieri, Cook, and Escobar (1986) have suggested that a PND higher than 90% indicates highly effective outcomes, 70% to 90% illustrates fair outcomes, 50% to 70% represents questionable outcomes, and a PND of less than 50% suggests an unreliable treatment. Thus, a PND of 70% between baseline and intervention phases is considered acceptable when determining the effectiveness of the Social Story on each participant's social interactions.

The PND were calculated for each participant's appropriate social interactions. For Steven, PND for appropriate social interactions was only 10%, suggesting an unreliable treatment; for Drew, PND was 89%, only 1 point below the cutoff for a highly effective outcome; for Billy, PND was 69%, only 1 point below the cutoff for a fair outcome.

Discussion

With regard to the overall efficacy of the Social Stories, one participant demonstrated a marked increase in appropriate social interactions. The greatest increase occurred for Drew, whose social interactions improved from a mean of 7% of intervals during baseline to a mean of 39% of intervals during intervention. Billy demonstrated a modest improvement from baseline to intervention (13%–28% of intervals). Steven, on the other hand, demonstrated no meaningful improvement from baseline to intervention (1%–4% of intervals).

Immediate treatment effectiveness was observed for Drew, whose target behavior consisted of appropriate social interactions during free time. Very quickly reading the story be-

came part of his daily routine, and he read the story without prompting. During baseline, Drew appeared motivated to interact, as he did not isolate himself during lunchtime, but it was unclear whether he knew how to socialize in an appropriate manner. However, after the introduction of the Social Story, appropriate interactions increased as he initiated with peers sitting at a nearby table, a behavior he had not engaged in during baseline.

Throughout intervention, Drew talked about his after-school activities (e.g., Nintendo, bike riding) and his dog, both topics within the story. His preferred subject of conversation was wrestling, also a topic within his story, which appeared to generate lively discussion from his male peers as well. However, Drew was never observed asking peers about their pets, their preferred after-school activities, or their favorite television shows, which were also topics within his Social Story. There was anecdotal evidence suggesting that generalization of conversation topics may have occurred for Drew. For example, an examiner observed him talking about his teachers, his classes, and school pictures, which were not conversation topics within the Social Story.

Improvements for Billy, whose social behaviors during baseline included isolation, stereotypies (e.g., circling the perimeter of a tree), and inappropriate interactions (e.g., pushing peers, negative comments), increased 15% above mean baseline levels. Billy was observed talking about Disney movies on several occasions, as his story instructed; however, he was not observed talking about the movies in the way the story suggested. For example, he often provided peers with a verbal list of his favorite movies without talking specifically about the movies themselves. Furthermore, he did not reciprocally ask peers to name their favorite movies.

It should be noted that Billy's appropriate social interactions appeared to be increasing in number toward the end of the study; however, he was the last participant to begin the intervention, and the study concluded 2 weeks later. Perhaps with additional sessions and more time, Billy might have achieved even greater increases in his appropriate social interactions.

Although Billy readily accompanied his teacher to the area where she read the Social Story, Billy was noncompliant with most academic task demands and often resisted reading the story or having the story read to him. Although Billy resisted the story, he liked having his own book and on many occasions asked his teacher if he could bring his book home to keep in his room.

Steven continued to engage in zero rates of appropriate social interactions during treatment with few exceptions (i.e., Intervention Sessions 2, 7, and 8). For example, on one occasion he asked a peer to draw and the two became engaged in the activity for a majority of the session (Intervention Session 2). On two other occasions (Intervention Sessions 7 and 8), the experimenter observed Steven reciting his story aloud from memory (i.e., "I can ask Mary to play with me, and I can ask Joey to play with me"), selecting a toy, approaching the table

where peers were playing, and subsequently playing with a peer for part of the sessions.

Antisocial behavior of the peers in Steven's class may have affected his social interaction behaviors, and the lack of control over the behavior of the other students in the classroom potentially altered treatment outcomes for him. For example, on two occasions Steven asked a peer to play with him; however, each time the peer did not respond, and, subsequently, Steven engaged in inappropriate behaviors (i.e., screaming and throwing toys). The peer's lack of responsiveness may have lessened the likelihood that Steven will initiate in the future. In addition, the examiner observed Steven refusing a peer's request to draw together (i.e., "I don't want to"), again affecting the probability of a future peer initiation. Anecdotal reports indicated that peers in Steven's classroom engaged in disruptive and inappropriate behaviors themselves during playtime. For example, peers were observed to grab markers, erasers, and drawing boards from each other as well as to argue over these items. However, these peers were able to hear the Social Story as it was read to Steven in a corner of the room. Thus, although the Social Story was not effective for Steven, a residual effect appears to be a modification of the behavior of the rest of the class that was exposed to the daily reading of the story. Subsequently, on several occasions the peers were observed to comply with the rules of the story by sharing toys and engaging in conversation.

In the future, it may be beneficial to have the student assist with writing the story as well as reviewing and modifying it before intervention begins. For example, the experimenter did not observe Drew saying "See you later" at the end of his activity as his story suggested. He reported to his teacher that "See you later" was a phrase he did not use; however, it should be noted that Drew did not close his conversations with peers at all. He generally got up from the table and headed back to class. It may have been helpful to have Drew write a Social Story that explained the social importance of closing interactions.

Limitations and Directions for Future Research

Several factors limit generalization of the results, making future research necessary to fully determine the extent to which Social Stories are effective. First, it is unknown whether a Social Story for Steven would have produced positive behavior changes had the story been more specific. For example, Steven's Social Story contained a choice of activities and a choice of peers. Providing several choices may have confused him, whereas a story specifically directing him to draw with a single peer, for example, may have been less ambiguous.

To some degree Steven attempted to comply with the rules stated in the story on several occasions. For example, the examiner observed him playing with puppets and dolls as the story suggested; however, he did not engage in interactive play with his peers for a majority of the sessions. Although he answered the comprehension questions accurately, it is possible

that he did not possess the skills necessary to interact with others in the manner the story described. Also, as noted previously, the behaviors of Steven's peers may have negatively impacted (i.e., lessened) his social initiations.

Although verbal prompts were not a planned part of the research methodology, examiners observed two of the teachers verbally prompting participants by referring directly to the Social Story. For example, Steven's teacher instructed a peer to ask Steven to play. However, the peer refused, suggesting that peers may not always be receptive to the social initiations of students with ASD. Billy's teacher also verbally prompted him on one occasion to "talk nicely to the other students." However, Billy reported that he did not want to talk and then isolated himself for the remainder of the session. The examiner reminded the teacher not to verbally prompt the participant to engage in appropriate social interactions. It is noteworthy that this prompting on the part of the teacher emerged in previous studies as well (e.g., Scattone et al., 2002). The degree to which rigid control over verbal prompting is feasible may be limited in classrooms where teachers try to take advantage of naturally occurring teaching opportunities.

Another possible threat to the internal validity of the study was that Billy was undergoing chelation therapy for the removal of lead, mercury, and other heavy metals at the time the study was conducted. However, this intervention was underway well before the Social Story intervention was implemented and in place for the duration of the study. No changes in the medical intervention occurred in relation to the phase change for Billy.

A final limitation is the manner in which treatment integrity was recorded. Treatment integrity was recorded simply as whether the Social Story was read by or to each participant at the specified time. Additional procedural steps or components (e.g., proper positioning of student and teacher, correct location of the reading, comprehension questions asked only until answered correctly) should have also been recorded. Although the experimenter corrected any procedural errors the few times they occurred, there is no precise empirical record of the percentage of accuracy of these treatment components.

It is difficult to determine the exact role that cognitive ability plays in relation to Social Stories. For example, Drew and Billy both received measured intelligence scores in the average range of cognitive ability (i.e., 95); however, only Drew demonstrated a noticeable improvement in social behaviors. Furthermore, the intervention was not effective for Steven, who had a measured IQ of 67. In the study by Scattone et al. (2002), the most dramatic improvement occurred for the participant with the lowest cognitive score (i.e., 40) on intelligence testing and with little functional communication. However, reading was a preferred activity for that participant, and he was often observed sitting in a corner reading a book. Another participant in that study also read his story and made improvements. However, the final participant did not yet read and had his story read to him; he made only modest im-

provements. Thus, the difference between a participant reading his own story versus having the story read to him warrants further investigation.

In most of the existing studies, either an adult or peer read the Social Stories to the participants. To date, there are only two studies in which the participant read his Social Story aloud to another person (Scattone, Wilczynski, Edwards, & Rabian, 2002; Thiemann & Goldstein, 2001). In the Thiemann and Goldstein study, the participants were fully integrated into regular education for all or part of their day, and all were responsible for reading their own Social Stories. However, one of the participants did not enjoy reading, and researchers made modifications for him and his peers to take turns reading the Social Story aloud.

The age of the participant may also influence the story's effectiveness. Steven and Billy were both 8 years old, whereas Drew was 13 years old, suggesting that, for some students with ASD, adolescence may be a time of increased motivation for learning social interaction skills.

Anecdotal reports by teachers and data collectors indicated that typical peers demonstrated patience and understanding when interacting with their peers with ASD; therefore, future research should also include a typical peer (rather than the teacher) monitoring the reading of the Social Story.

Future investigations should systematically examine the additive effects of Social Stories when combined with other interventions (e.g., prompts, reward systems, video feedback). For example, although the intervention was most effective for Drew and somewhat effective for Billy, effectiveness may have increased for some or all of the participants had an additional component been systematically added.

This study was conducted according to the guidelines proposed by Gray (1998), who developed this intervention through years of experience as an educator. There is no evidence to date that Gray developed these guidelines as part of a systematic research agenda. Researchers should systematically examine each of Gray's guidelines in order to determine which components are crucial in the development of a successful Social Story and which may be irrelevant.

Conclusions

In conclusion, this study replicated and extended the literature by demonstrating that Social Stories may be used in order to increase appropriate social interactions for some children on the autism spectrum when used as a sole intervention. This study differs from previous studies that attempted primarily to promote appropriate social behaviors (Barry & Burlew, 2004; Norris & Dattilo, 1999; Swaggart et al., 1995; Thiemann & Goldstein, 2001) by using only one story to represent a given social situation without the combination of another intervention.

The present study did not achieve the same level of positive behavior change as did a previous study intending to decrease disruptive behaviors (Scattone et al., 2002), although both studies used Social Stories in isolation. One explanation

is that directing a child not to engage in a given disruptive behavior (e.g., chair tipping) is less complex than asking a child to engage in reciprocal conversation or reciprocal play. In addition, Norris and Dattilo (1999) found Social Stories effective in reducing inappropriate social behaviors rather than improving appropriate social behavior. These results may suggest that Social Stories, when used as a sole intervention to increase appropriate social interactions, are limited in their effectiveness. An alternative explanation is that the field has not yet identified the population that may benefit best from this intervention for increasing appropriate social skills. Further research is needed in all of these areas in order to demonstrate the extent to which Social Stories are an effective intervention.

ABOUT THE AUTHORS

Dorothy Scattone, PhD, is an assistant professor of pediatrics and psychiatry at the University of Mississippi Medical Center. Her current interests include teaching language and social skills to children with autism spectrum disorders. *Daniel H. Tingstrom*, PhD, is a professor in the School Psychology Program in the Department of Psychology at the University of Southern Mississippi. His research interests include applied behavior analysis and the implementation and evaluation of behavioral and academic interventions. *Susan M. Wilczynski*, PhD, BCBA, is the executive director of the National Autism Center. Her current interests include the National Standard Project and evidence-based treatment for autism spectrum disorders. Address: Dorothy Scattone, Department of Pediatrics, Division of Child Development and Behavioral Medicine, School of Medicine, University of Mississippi Medical Center, 2500 North State Street, Jackson, MS 39216-4505; e-mail: dscattone@ped.umsmed.edu

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APPENDIX A
Social Story Format

The Social Story format suggests using a combination of seven sentence types with an emphasis on description:

1. Descriptive sentences describe a given situation objectively by defining where the situation occurs, when it will take place, who is involved, what they are doing, and why they are doing it.
2. Perspective sentences state what another individual, usually someone other than the child with autism spectrum disorder, may think or feel.
3. Cooperative sentences can be used to remind adults how they can assist the student to learn a new skill.
4. Directive sentences are sentences that define the response the individual is expected to provide and generally begin with "I will try" or "I will work on" rather than "I will" to allow for some flexibility.
5. Affirmative sentences generally stress the directive in the Social Story.
6. Control sentences are written by the student and help him or her remember the directive.
7. Partial sentences are fill-in-the-blank sentences that require the student to provide the correct response.

Note. Adapted from Gray (2004).

APPENDIX B
Social Story Guidelines

- Shares social information in a reassuring manner; at least 50% of the stories should praise achievements.
- Has an introduction, body, and conclusion.
- Answers "wh" questions.
- Is written from the student's perspective (i.e., first-person or third-person format).
- States behaviors positively.
- Contains descriptive sentences and some or all of the other types of sentences.
- Describes actions and events rather than directs.
- Is geared to the individual's abilities and incorporates her or his interests.
- May use visual supports and illustrations.
- Has a title that is consistent with applicable criteria above.

Note. Adapted from Gray (2004).

APPENDIX C
Social Stories for Steven, Drew, and Billy

Steven: Playtime

When Miss Anne or Miss Katie says it's playtime, all of the kids go to the play area and take a toy. There are many toys to play with. There are blocks. There are crayons and coloring books. There is Play Doh. There are puppets and dolls. There is also a drawing board and markers.

All of the kids in my classroom like to play at playtime! The kids laugh a lot when they play with each other. The kids talk to each other when they are playing with toys. I will try to play with the other kids. I will walk up to one of the kids and say, "Do you want to play with me?" Sometimes I could ask Mary to play with me. Sometimes I could ask Billy to play with me. Sometimes I could ask Joey to play with me. Sometimes I could ask Missy to play with me. Today, I will try to ask _____ if they will draw with me.

I will walk up to them and tap them on the shoulder. I will say, "Will you draw with me?" I will hand them a marker and eraser. If they do not hear me, I can tap them on the shoulder and say again, "Will you draw with me?" Then I will hand them the marker and walk to the drawing board. Mary will like it if I ask her to draw with me. Billy will like it if I ask him to draw with me. Joey will like it if I ask him to draw with me. Missy will like it if I ask her to draw with me.

Comprehension Questions

1. When Miss Anne or Miss Katie says it's playtime, what do the kids do?
2. What toys can I play with at playtime?
3. Who can I play with at playtime?

Drew: What to Talk About at Lunchtime

There are lots of kids in the cafeteria at lunchtime. Some of the kids are getting their lunch. Some of the kids are already sitting down. Most of the kids are eating lunch. Most of the kids are talking to each other too! The kids like to talk to each other during lunchtime. Usually there are two or three other kids seated at my table. It's good to talk to other kids when sitting in the cafeteria. I will try to talk to the kids seated at my table during lunchtime. They will like it if I talk to them! They will usually talk to me too!

There are lots of things I can talk to the other kids about:

I can tell the other kids about the latest wrestling match on TV. I can tell the other kids what I watched on TV yesterday. I can ask each of the other kids about shows they watched on TV and if they were good or boring.

I can tell the other kids what I'm doing after school today. I can ask each one of them what they are doing after school.
I can tell the other kids about something funny my dog Max did. I can ask the other kids if they have a pet. I can ask them to tell me something funny their pet did.

The other kids may have something they want to talk about too. I can listen to what they say. I may want to talk about those other things too! When lunchtime is over, I will try to say "See you later" to the other kids. Then I will walk with them back to my classroom.

Comprehension Questions

1. What do the kids usually do at lunchtime?
2. What should I do at lunchtime?
3. What kinds of things can I talk with the other kids about?

Billy: Billy's Snack Book

When I am at school, we take a break called snack time. At snack time all of the kids usually go outside. I usually go outside too! There are lots of kids outside at snack time. Some of the kids are standing. Some of the kids are sitting, but they are talking to each other. The kids like to talk to each other at snack time. I will try to talk to the other kids too!

There are many things I can talk to the other kids about:
I can ask them what kinds of things they like to do after school.
I can tell them what kinds of things I like to do after school.
I can talk about what Disney movies I like.
I can ask about what Disney movies they watched.
I can ask them if they have pets.

The kids will like me if I talk to them. They will want to be my friend!

Comprehension Questions

1. What do the kids do at snack time?
2. What should I do at snack time?
3. What kinds of things could I talk about at snack time?

Participating in a Reciprocal Conversation – Social Article

Having a conversation with someone is a reciprocal activity. This means that **words are exchanged** between two or more people.

When people play a game of catch, they toss a ball back and forth to each other several times. **Having a reciprocal conversation is a lot like playing a game of catch.** You and the other person will talk about a specific topic "back and forth" as if you are throwing and catching words and thoughts to each other.

Usually, two people will have a topic of conversation that they talk about for a little while. While one person speaks by making a comment or asking a question about the topic, **the other person listens and waits for their turn.** Then, the second person gets a chance to make a comment or ask a question about the **same topic**.

The topic of conversation usually gets "tossed" back and forth **at least three times.** If both people really like the topic, they may "toss" the conversation back more than three times until they run out of things to say about the topic.

Participating in a Reciprocal Conversation - Quiz

1.   Reciprocal conversation means that words and ideas are _____ between two or more people.

2.   Having a reciprocal conversation is like playing a game of _____.

3.   During a reciprocal conversation, one person _____ while the other person is listening and waiting their turn.

4.   A topic of conversation usually is "tossed" back and forth at least _____ times.

5.   People having a reciprocal conversation may change topics when they run out of _____ to say about a topic.

Staying on Topic

When people have a conversation, they pick a topic to discuss. They will often talk about this topic for a while and give each person a chance to make comments or ask questions about the topic. When everyone is done talking about the topic, they will then begin to talk about something different. **This is called "switching topics".**

When you have a conversation with someone about a topic, it is kind of like following a path together. You are following a path in your minds together by thinking about the same topic and focusing on the comments that are being made.

When someone in the conversation "switches topics", they are "changing the path" they are on. This forces the other people in the conversation to have to switch paths, too.
This is ONLY okay if everyone is ready to talk about something new.

Staying on Topic

When people have a conversation, they pick a _____ to discuss. They will often talk about this topic for a while and give each person a chance to make comments or ask _____ about the topic. When everyone is done talking about the topic, they will then begin to talk about something different. **This is called _____ topics".**

When you have a conversation with someone about a topic, it is kind of like following a _____ together. You are following a path in your _____ together by thinking about the same topic and focusing on the comments that are being made.

When someone in the conversation "switches topics", they are "changing the path" they are on. This _____ the other people in the conversation to have to _____ paths, too.
This is _____ okay if everyone is ready to talk about something _____ .